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MEASUREMENTS IN THE TURBULENT BOUNDARY LAYER AT CONSTANT PRESSURE IN SUBSONIC AND SUPERSONIC FLOW

Part I. Mean Flow

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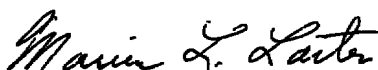
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20. ABSTRACT (Continued)

The present Part I of this report is limited to a description of the mean flow as observed using Pitot-tube, Preston-tube, and floating-element instrumentation. Emphasis is on the use of similarity laws with Van Driest scaling and on the inference of the shearing-stress profile and the normal velocity component from the equations of mean motion. The experimental data are tabulated.

Part II of this work, published separately, is a description of the mean flow and Reynolds-stress field as observed in the same flows using a single-particle laser-Doppler velocimeter.

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Summary

Experiments have been carried out to test the accuracy of laser-Doppler instrumentation for measurement of Reynolds stresses in turbulent boundary layers in supersonic flow. Two facilities were used to study flow at constant pressure. In one facility, data were obtained on a flat plate at $M_e = 0.1$, with Re_θ up to 8,000. In the other, data were obtained on an adiabatic nozzle wall at $M_e = 0.6, 0.8, 1.0, 1.3$, and 2.2 , with $Re_\theta = 23,000$ and $40,000$. The present Part I of this report is limited to a description of the mean flow as observed using Pitot-tube, Preston-tube, and floating-element instrumentation. Emphasis is on the use of similarity laws with Van Driest scaling and on the inference of the shearing-stress profile and the normal velocity component from the equations of mean motion. The experimental data are tabulated.

Part II of this report, published separately, is a description of the mean flow and Reynolds-stress field as observed in the same flows using a single-particle laser-Doppler velocimeter.

Preface

This report represents the results of one phase of research carried out at the Jet Propulsion Laboratory of the California Institute of Technology, under Contract NAS 7-100. The work described in this report was supported by the United States Air Force, Office of Scientific Research, under Contract F 44620-75-C-0007; by the Arnold Engineering Development Center, under MIPR EY 7483-76-0003 and EY 7483-76-0009; and by the California Institute of Technology, President's Fund, under Grant PF-075. The Program Element No. was 65807F.

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I. Introduction

The turbulent boundary layer at constant pressure has been studied experimentally and theoretically for many years. Collected experimental mean-velocity data for low-speed flow have been carefully reviewed by Coles (1962, Appendix A), who recommends taking the measurements by Wieghardt (1943) as the best available standard. A catalog and a comparable review of mean-velocity data for high-speed flow (including flow with pressure gradient) are presently being prepared for AGARD by Fernholz and Finley (1977). One method being used by Fernholz (1976) to organize the information in this AGARD catalog is recasting of the compressible-flow results into a form appropriate for incompressible flow. For this purpose, the wall-wake model for the mean-velocity profile (a model which has been thoroughly exercised for incompressible flow by Coles (1968)) and the mixing-length scaling proposed for compressible flow by Van Driest (1951) appear to be quite useful.

Measurements of Reynolds stresses in high-speed turbulent boundary layers are rare. For incompressible flow, the turbulent shearing stress can be measured directly, or it can be calculated from the distribution of mean velocity with the aid of well-established similarity laws. Good agreement between measured and calculated values, as in the case of the hot-wire measurements by Klebanoff (1954), helps to establish confidence in the extension of hot-wire methods to more complicated flows. Recent measurements by Johnson and Rose (1973), Yanta and Lee (1974), and Abbiss (1976) have attempted to extend this process to the use of laser-Doppler instrumentation in supersonic flow at Mach numbers in the range 1.5 to 3.0. However, a serious anomaly appears in the case of the turbulent shearing stress, defined as $-\overline{\rho u'v'}$. The maximum value occurs much further from the wall than is reasonable for flow at constant

pressure. The anomaly has been discussed by Sandborn (1974), who supports the conjecture by some of the authors cited that density fluctuations may contribute substantially to the turbulent stresses near the wall. This conjecture is in direct opposition to the conclusion by Morkovin (1961) that effects of density fluctuations should be small compared to effects of variations in mean density for Mach numbers up to 4 or 5.

The purpose of the present experiments is to obtain redundant data over a substantial range of Mach numbers ($M_e = 0.1$ to 2.2), in an effort to resolve the anomaly in turbulent shearing stress. Essentially the same range of Mach numbers has also been studied by Winter and Gaudet (1970), who used a Pitot tube to determine mean velocity and a floating-element balance to determine surface friction. However, no measurements were made of turbulent stresses.

The present measurements have sufficient redundancy to permit a realistic assessment of their accuracy. The primary instrumentation is a Pitot tube which traverses the boundary layer. In addition, surface-friction measurements are made using both a floating-element balance and a Preston tube. The mean-flow scaling suggested by Van Driest is applied to the data, to test the adequacy of a single similarity formulation for both compressible and incompressible flow, and the shearing-stress distribution is calculated as part of the analysis.

The results are discussed in Part I of this work. An Appendix contains a complete record of the experimental data in tabular and graphic form.

A laser-Doppler velocimeter has also been used to measure mean velocity and three components of Reynolds stress in the same flow. The results of the LDV studies will be reported by P. E. Dimotakis, D. J. Collins, and D. B. Lang in Part II of this work.

II. Flow Facilities

A. High-Speed Flow

Measurements were made in the ceiling boundary layer of the 20-inch wind tunnel at the Jet Propulsion Laboratory, at nominal free-stream Mach numbers M_e of 0.6, 0.8, 1.0, 1.3, and 2.2, at nominal Reynolds numbers Re_θ of 23,000 and 40,000. The JPL facility is a continuously operating, variable-density tunnel, with a test section 45.7 cm wide by 50.8 cm high. The top and bottom walls of the tunnel diverge slightly to compensate for boundary-layer growth.

For the present experiments, the region of uniform flow in the test section was extended approximately 150 cm beyond the end of the flexible nozzle, or 60 cm beyond the center of the schlieren windows, by installation of a pair of instrumented flat plates on the floor and ceiling of the tunnel. Particular care was taken to obtain a smooth junction between the plates and the nozzle wall.

From the experience, for example, of Liepmann and Ashkenas (1947), it has long been known that the experimental treatment of the downstream boundary condition is important at transonic speeds. The unsteady behavior often observed in transonic shock-wave boundary-layer interactions may be partly a consequence of unsteady flows generated in the diffuser. For the present experiments, stable flow at high subsonic free-stream Mach numbers was achieved by introducing a variable-thickness double-diamond airfoil choke in the diffuser.* The choke was oriented vertically in the diffuser, normal to the test plate, with the leading edge of the choke located 70 cm downstream from the balance station.

*The advice of H. Ashkenas during this development is much appreciated.

The point of maximum thickness was located 15 cm further downstream. Flow past the choke was relieved by expanding the diffuser doors by 7.3° on each side in order to maintain constant area at the minimum thickness setting. High-speed schlieren movies showed that this arrangement eliminated the upstream-running waves observed in previous experiments and provided a quiet environment in which to perform transonic boundary-layer experiments.

Local static pressure was measured at 82 static-pressure orifices located throughout the test section and diffuser. The measurements used the JPL multiport measuring system, which simultaneously recorded the stagnation temperature and pressure, the free-stream static pressure, and the pressure from two 0-15 psia Statham pressure transducers, each of which sequentially sampled 50 orifices.

Typical free-stream Mach-number distributions for the present experiments are shown in Fig. 1. There is no substantial pressure gradient over a distance of about 140 cm upstream and about 40 cm downstream from the balance station.

B. Low-Speed Flow

Additional measurements were made in the Merrill wind tunnel of the Graduate Aeronautical Laboratories at the California Institute of Technology, at a free-stream velocity of 37 m/sec. This tunnel is a continuously operating closed-return facility with the downstream end of the test section vented to ambient pressure. The test section is 115 cm wide by 82 cm high and has diverging walls to account for boundary-layer growth.

The test plate for these experiments was made from 1.9-cm thick plywood, surfaced on both sides with 1-mm thick formica to provide a smooth finish. The leading edge was elliptical, with a transition strip located immediately

downstream from the elliptical section. The horizontal plate spanned the test section and extended 244 cm downstream from the beginning of the test section. The plate was supported from the ceiling of the tunnel, and all measurements were made on the lower surface.

Twenty static pressure taps were provided on the surface of the plate. A Scanivalve was used to select the pressure to be read by a Barocel digital manometer. The resulting free-stream Mach-number distribution, shown in Fig. 2, indicates that pressure-gradient effects should be small.

III. Pitot-Pressure Data

A. Instrumentation

For the experiments at JPL, a Pitot-pressure probe could be introduced into the boundary layer through the ceiling of the tunnel at any one of the five axial stations listed in Table 1. The origin for the x-coordinate is the center of the floating-element friction balance, 11.3 cm downstream from the junction between the nozzle wall and the test plate. During the probe measurements, the balance was replaced by a blank port which was instrumented with static-pressure taps.

The Pitot-pressure probe was constructed from stainless steel hypodermic tubing. The probe tip was formed by flattening 0.127-cm diameter tubing to an oval measuring 0.0127 cm inside (in the direction normal to the plate), with the lip thickness honed to 0.003 cm. The center of the support stem was 5.08 cm downstream from the probe tip. The probe position, the Pitot pressure, the tunnel stagnation temperature, and the tunnel stagnation and static pressures were recorded by the data system.

For the experiments at CIT, two techniques were employed. Within the first 100 cm from the leading edge of the plate, Pitot measurements were made

using a seven-tube rake. Further downstream, Pitot measurements were made by traversing a small probe through the boundary layer, as in the high-speed experiments. The probe tip was flattened to an oval measuring 0.0203 cm inside (in the direction normal to the plate), with a lip thickness of 0.020 cm. Boundary-layer measurements were made at the stations listed in Table 2.

B. Data Reduction

For each Pitot-pressure profile, a change of slope in the pressure data was used to define the point of contact of the probe with the wall. No displacement correction was made. The free-stream static pressure for each profile was taken as the average static pressure in the test section in the vicinity of the probe. The flow properties at the edge of the boundary layer were then computed using the average Pitot pressure well outside the boundary layer. Assuming constant static pressure, the local Mach number was computed either directly or through the normal shock relations, as appropriate.

The local stagnation temperature in the boundary layer was not measured. However, for the JPL experiments, the temperature measured by a thermocouple embedded in the surface-friction balance structure indicated that the flow was essentially adiabatic. Hence the temperature may be estimated from a variant of the adiabatic Crocco relation,*

*Equation (1) is often used in the reduction of experimental data, despite the fact that it does not conserve energy in adiabatic flow. The present data analysis assumes that p and M are measured exactly. Hence so are $T_o/T = 1 + (\gamma-1)M^2/2$, $u/(\gamma RT)^{1/2} = M$, and $\rho u^2 = \gamma p M^2$. If use of Eq. (1) introduces a local relative error of ϵ in T_o , the relative errors in T , u , ρ , and ρu are ϵ , $\epsilon/2$, $-\epsilon$, and $-\epsilon/2$, respectively.

$$\frac{T}{T_e} = \frac{\rho_e}{\rho} = 1 + r \left(\frac{\gamma-1}{2} \right) M_e^2 \left[1 - \left(\frac{u}{u_e} \right)^2 \right] = \frac{1 + r \left(\frac{\gamma-1}{2} \right) M_e^2}{1 + r \left(\frac{\gamma-1}{2} \right) M^2}, \quad (1)$$

where the recovery factor r is defined by

$$r = \frac{T_w - T_e}{T_o - T_e}, \quad (2)$$

and is assigned the constant value $r = 0.885$.

C. Results for the Mean Flow

Typical mean-velocity profiles measured at the balance station (JPL-4) for nominal Reynolds numbers Re_θ of 23,000 and 40,000 are presented in Figs. 3 and 4. Values for viscosity are obtained from the Sutherland viscosity law,

$$\frac{\mu}{\mu_r} = \left(\frac{T_r + S}{T + S} \right) \left(\frac{T}{T_r} \right)^{3/2}, \quad (3)$$

where $T_r = 291.75^\circ\text{K}$, $S = 110^\circ\text{K}$, and $\mu_r = 1.827 \times 10^{-4}$ gm/cm-sec. One profile at $Re_\theta = 8000$ from the low-speed experiments (CIT-9) is also included in the figures for comparison. A complete data tabulation appears in the Appendix.

Integral thicknesses for the boundary layer are computed from

$$\delta^* = \int_0^\delta \left(1 - \frac{\rho u}{\rho_e u_e} \right) dy, \quad (4)$$

and

$$\theta = \int_0^\delta \frac{\rho u}{\rho_e u_e} \left(1 - \frac{u}{u_e} \right) dy. \quad (5)$$

The boundary-layer form parameter H is defined as

$$H = \frac{\delta^*}{\theta} \quad (6)$$

For two-dimensional mean flow, the surface friction can be obtained from von Kármán's momentum-integral equation,

$$C_f = 2 \frac{d\theta}{dx} - 2 \left(2 + H - M_e^2 \right) \frac{\theta}{\gamma M_e^2} \frac{1}{P} \frac{dP}{dx} \quad (7)$$

The accuracy of Eq. (7) is expected to be low, primarily because of difficulty in differentiating experimental data for $\theta(x)$ and $u_e(x)$ (see Table A3 of the Appendix). For the present measurements, the second term in Eq. (7) is at most 3 percent of the first term, and is uncertain by a comparable amount. Hence this term has been discarded. Values for $C_f = 2 d\theta/dx$ are listed in Table 3, which compares values obtained for C_f by this and several other methods.

D. Van Driest Scaling

The compressibility transformation proposed by Van Driest (1951) uses the mixing-length expression

$$\tau = \tau_w = \rho \ell^2 \left(\frac{du}{dy} \right)^2 \quad (8)$$

together with Prandtl's hypothesis

$$\ell = \kappa y \quad (9)$$

to obtain

$$\rho^{1/2} \frac{du}{dy} = \frac{\tau_w^{1/2}}{\kappa y} \quad (10)$$

The appearance of the combination $(\rho^{1/2} du)$ suggests that the velocity u should be replaced by an effective velocity u^* defined by

$$u^* = \int_0^u \left(\frac{\rho}{\rho^*} \right)^{1/2} du, \quad (11)$$

where ρ^* is a constant reference density included for dimensional reasons.

Integration of the mixing-length equation (8) then gives

$$u^* = \frac{1}{\kappa} \left(\frac{\tau_w}{\rho^*} \right)^{1/2} \ln \left(\frac{y}{y^*} \right) + \text{constant}, \quad (12)$$

where y^* is a constant reference length also included for dimensional reasons.

Equation (12) is typical of mixing-length formulas in that it is at best an unclear description of a small fragment of the mean-velocity profile. The choice for ρ^* and y^* and the value of the constant in Eq. (12) are customarily resolved by emphasizing quantities evaluated at the wall. For example, the definition (11) is readily integrated in closed form for the energy integral (1). The result is the Van Driest scaling for velocity in the case of adiabatic flow,

$$\kappa \left(\frac{\rho^*}{\rho_w} \right)^{1/2} \frac{u^*}{u_e} = \sin^{-1} \left(\kappa \frac{u}{u_e} \right), \quad (13)$$

where m , defined by

$$m^2 = \frac{T_w - T_e}{T_w} = \frac{r \left(\frac{\gamma-1}{2} \right) M_e^2}{1 + r \left(\frac{\gamma-1}{2} \right) M_e^2} , \quad (14)$$

obviously cannot exceed unity.

The form of Eqs. (12) and (13) suggests, but does not require, choosing $\phi^* = \rho_w$ and $y^* = v_w/u_\tau$, where

$$u_\tau = \left(\frac{\tau_w}{\rho_w} \right)^{1/2} , \quad (15)$$

is the friction velocity. The choice $y^* = v_w/u_\tau$, in particular, is necessary if the functional dependence of u on y in Eq. (12) is to hold at the wall. Such reasoning, however, is not part of the mixing-length argument, which applies only outside the sublayer. Given these choices, then in a usual notation Eq. (12) becomes

$$u^+ = \frac{1}{\kappa} \ln y^+ + c , \quad (16)$$

where

$$u^+ = \frac{u^*}{u_\tau} , \quad y^+ = \frac{y u_\tau}{v_w} , \quad (17)$$

and

$$m \frac{u^*}{u_e} = \sin^{-1} \left(m \frac{u}{u_e} \right) . \quad (18)$$

The choice for ρ^* , u_T , and y^* is important because it controls the dependence of κ and c on M_e and γ . What is wanted is the particular choice which minimizes this dependence. There is substantial evidence, for example, in papers by Fenter and Stalmach (1957), Rotta (1960), Moore and Harkness (1964), Maise and McDonald (1968), Michel, Quemart, and Elena (1969), Danberg (1971), Squire (1971), and Fernholz (1976), that use of wall quantities as in Eqs. (16)-(18) is very nearly optimum from this point of view, at least for adiabatic flow at constant pressure at Mach numbers up to 5.

Most of these authors have also gone beyond the mixing-length argument to consider a more general fit to a defect law or to a combined wall-wake formulation of the mean profile, in the manner adopted by Coles (1968) for low-speed flow; i.e., a fit to

$$u^+ = \frac{1}{\kappa} \ln y^+ + c + 2 \frac{\Pi}{\kappa} \sin^2 Y, \quad (19)$$

where

$$Y = \frac{\pi}{2} \frac{y}{\delta}. \quad (20)$$

Such a fit has been carried out for the present measurements, with quite satisfactory results. The constants κ and c are given their incompressible values, $\kappa = 0.41$ and $c = 5.0$. The parameters u_T , Π , and δ are then determined by a two-parameter least-squares fit of the experimental data to Eq. (19), taking as a third condition the constraint imposed by the local friction law,

$$u_e^+ = \frac{1}{\kappa} \ln \delta^+ + c + 2 \frac{\Pi}{\kappa}. \quad (21)$$

As proposed by Coles (1968), data near the wall and near the free stream are excluded. For the JPL experiments, data are retained for $y^+ \geq 200$ and $y/\delta \leq 0.95$. For the CIT experiments, data are retained for $y^+ \geq 80$ and $y/\delta \leq 0.95$. Typical examples of the resulting fit are shown in Fig. 5. The values obtained for δ are indicated by tick marks in Figs. 3 and 4; they correspond to values for u/u_e of 0.996 to 0.998.

The quality of Van Driest scaling, when universal constant values are assumed for κ and c , can be tested in different ways. One test is to compare values inferred for the local friction coefficient

$$C_f = 2 \frac{\rho_w}{\rho_e} \left(\frac{u_\tau}{u_e} \right)^2, \quad (22)$$

with values obtained by other means. Table 3 makes this comparison. If the floating-element data are taken as a standard, the conclusion for the present experiments is that the profile fit gives values for C_f which are slightly high. The discrepancy is small at subsonic speeds, but increases to about 6 percent at $M_e = 2.2$.

A second test is to compare values obtained for the profile parameter Π with corresponding values for low-speed flow, as defined by the low-speed data of Wieghardt (1943). This comparison is made in Fig. 6.* The main conclusion is that there is very little effect of compressibility on the shape of the mean-velocity profile in Van Driest coordinates, at least for

*The particular choice of $C_f Re_\theta$ for the abscissa in Fig. 6 (Coles 1962) is not important for these data, although it might become important if the figure included data at higher Mach numbers and lower Reynolds numbers.

Mach numbers up to 2.2. This conclusion is supported by the inclusion of a few representative points from the work by Winter and Gaudet (1970). There may be a tendency for Π to decrease slightly at large Reynolds numbers, as noted for low-speed flow by Coles (1962, Appendix A).

E. Inferred Data for v/u and τ/τ_w

The distributions of normal velocity and shearing stress through the boundary layer are of central interest in these experiments because of the direct comparison with LDV measurements to be made in Part II of this report. From the equation of continuity,

$$\rho v = - \int_0^y \frac{\partial \rho u}{\partial x} dy , \quad (23)$$

and from the equation for conservation of momentum in flow at constant pressure,

$$\tau - \tau_w = \rho uv + \int_0^y \frac{\partial \rho u^2}{\partial x} dy . \quad (24)$$

It is desired to evaluate the integrals in Eqs. (23) and (24) for the Van Driest description of the mean velocity profile with similarity, Eq. (19). A useful first step is a change of variable. Put

$$m \frac{u^*}{u_e} = U , \quad (25)$$

so that Eq. (18) becomes

$$m \frac{u}{u_e} = \sin U . \quad (26)$$

The corresponding form of Eq. (1) is

$$\frac{\rho_e}{\rho} = \frac{T_w}{T_e} \cos^2 U \quad . \quad (27)$$

These may be substituted in Eqs. (23) and (24) to obtain

$$\sigma v = \rho_e u_e \frac{T_e}{T_w} \frac{d\delta}{dx} P \quad , \quad (28)$$

and

$$\tau = \tau_w - \rho_e u_e^2 \frac{T_e}{T_w} \frac{d\delta}{dx} \left(2Q - \frac{u}{u_e} P \right) \quad , \quad (29)$$

where the quantities denoted by P and Q are the definite integrals

$$\frac{d\delta}{dx} P = - \frac{1}{m} \int_0^y \frac{(1 + \sin^2 U)}{\cos^3 U} \frac{\partial U}{\partial x} dy \quad , \quad (30)$$

and

$$\frac{d\delta}{dx} Q = - \frac{1}{m^2} \int_0^y \frac{\sin U}{\cos^3 U} \frac{\partial U}{\partial x} dy \quad . \quad (31)$$

Note that $d\delta/dx$ is a phantom factor in these expressions. If Eqs. (28) and (29) are evaluated at the edge of the boundary layer, where $\tau = 0$, $\rho = \rho_e$, $u = u_e$, and $v = v_e$, the result is

$$\frac{v_e}{u_e} = \frac{T_e}{T_w} \frac{d\delta}{dx} P_e = \frac{d\delta^*}{dx} \quad , \quad (32)$$

and

$$\frac{\tau_w}{\rho_e u_e^2} = \frac{T_e}{T_w} \frac{d\delta}{dx} (2 Q_e - P_e) = \frac{d\theta}{dx} \quad (33)$$

It follows that

$$\frac{d\delta}{dx} P_e = \frac{T_w}{T_e} \frac{d\delta^*}{dx} \quad (34)$$

and that

$$\frac{d\delta}{dx} Q_e = \frac{1}{2} \frac{T_w}{T_e} \frac{d}{dx} (\delta^* + \theta) \quad (35)$$

Given $U(x,y)$, the most convenient form for calculation is probably the normalized form

$$\frac{v}{v_e} = \frac{\rho_e}{\rho} \frac{P}{P_e} \quad (36)$$

and

$$\frac{\tau}{\tau_w} = 1 - \frac{\left(2 Q - \frac{u}{u_e} P\right)}{\left(2 Q_e - P_e\right)} \quad (37)$$

To undo the normalization in Eq. (37), a value must be specified for $\tau_w/\rho_e u_e^2$; i.e., for C_f . The derivative $d\delta/dx$ may then be calculated from Eq. (33) and inserted in Eq. (32) to obtain a value for v_e/u_e . This value can be used in turn to undo the normalization in Eq. (36), with the result

$$\frac{v}{u} = \frac{\tau_w}{\rho_e u_e^2} \frac{\rho_e u_e}{\rho u} \frac{P}{(2 Q_e - P_e)} \quad (38)$$

The analysis so far involves only the formalism of Van Driest scaling, inasmuch as the function $U(x,y)$ has not been specified. For purposes of curve fitting, this function is defined by Eq. (19) outside the sublayer. Other authors, notably Maise and McDonald (1968) have also made calculations equivalent to using Eq. (19) in Eq. (29) to obtain the distribution of τ/τ_w . However, for accurate evaluation of the integrals P and Q near the wall, both U and $\partial U/\partial X$ need to be more accurately defined in the sublayer. We therefore revise Eq. (19) to read

$$u^+ = \frac{1}{m} \frac{u_e}{u_\tau} U = f(y^+) + 2 \frac{\Pi}{\kappa} \sin^2 Y, \quad (39)$$

and we describe the flow near the wall by an implicit formula for $f(y^+)$ proposed by Spalding (1961) and independently by Kleinstein (1967),

$$y^+ = f + e^{-\kappa c} \left[e^{\kappa f} - 1 - (\kappa f) - \frac{(\kappa f)^2}{2} - \frac{(\kappa f)^3}{6} \right] \quad (40)$$

This formula has the proper behavior near the wall, where $f = y^+ + O(y^+)^4$, and also outside the sublayer, because for $(\kappa f) \gg 1$ Eq. (40) reduces to Eq. (16). It is Eq. (40) which is plotted in the sublayer region in Fig. 5.

For Π , u_e and m constant, differentiation of Eq. (39) gives

$$\frac{1}{m} \frac{u_e}{u_\tau} \frac{\partial U}{\partial x} = \left[u^+ + y^+ f'(y^+) \right] \frac{1}{u_\tau} \frac{du_\tau}{dx} - 2 \frac{\Pi}{\kappa} Y \sin(2 Y) \frac{1}{\delta} \frac{d\delta}{dx}, \quad (41)$$

where, from Eq. (40),

$$\frac{1}{f'(y^+)} = 1 + \kappa e^{-\kappa c} \left[e^{\kappa f} - 1 - (\kappa f) - \frac{(\kappa f)^2}{2} \right] . \quad (42)$$

The derivative du_τ/dx in Eq. (41) can be eliminated by noting from Eq. (21) that

$$\frac{1}{\delta} \frac{d\delta}{dx} = - (1 + \kappa u_e^+) \frac{1}{u_\tau} \frac{du_\tau}{dx} . \quad (43)$$

Consequently, the integrals P and Q may be written

$$P = \frac{1}{\delta} \frac{u_\tau}{u_e} \int_0^y \left(\frac{1 + \sin^2 U}{\cos^3 U} \right) \left[\frac{(u^+ + y^+ f')}{(\kappa u_e^+ + 1)} + 2 \Pi Y \sin(2Y) \right] dy , \quad (44)$$

and

$$Q = \frac{1}{m\delta} \frac{u_\tau}{u_e} \int_0^y \left(\frac{\sin U}{\cos^3 U} \right) \left[\frac{(u^+ + y^+ f')}{(\kappa u_e^+ + 1)} + 2 \Pi Y \sin(2Y) \right] dy . \quad (45)$$

The integrals P and Q are readily determined for a given profile once the parameters u_τ , Π , and δ are specified. For convenience of tabulation, we use experimental values for y and we determine y^+ from (17), Y from (20), U from (25), u^+ from (39), and f and f' by interpolation in (40) and (42), respectively. Thus the measured data influence the calculations only indirectly, through the fit which determines u_τ , Π , and δ .

Figures 7 and 8 show typical distributions for v/u and τ/τ_w calculated by this method, using profile parameters taken from the fit described in Section III-D. From these figures it is clear that both

quantities scale with outer variables, and that in normalized form they are relatively insensitive to changes in Mach number and Reynolds number.

Several authors, including Meier and Rotta (1970), Bushnell and Morris (1971), Horstman and Owen (1972), and Sturek (1973), have used a different and less structured method for calculating τ/τ_w in flow at constant pressure. Instead of wall-wake similarity with Van Driest scaling, the basic assumption is that u/u_e and ρ/ρ_e are functions only of y/δ or y/θ . In the former case, the problem of defining δ must be faced at the outset. In the latter case, this problem can be postponed. For generality, we take the independent variable as y/L . Then Eq. (28) is replaced by

$$v = u \frac{dL}{dx} \left(\frac{y}{L} - \frac{\rho_e u_e}{\rho u} \int_0^{y/L} \frac{\rho u}{\rho_e u_e} d \frac{y}{L} \right), \quad (46)$$

and Eq. (29) is replaced by

$$\tau = \tau_w - \rho_e u_e^2 \frac{dL}{dx} \left(\frac{u}{u_e} \int_0^{y/L} \frac{\rho u}{\rho_e u_e} d \frac{y}{L} - \int_0^{y/L} \frac{\rho u^2}{\rho_e u_e^2} d \frac{y}{L} \right). \quad (47)$$

When the integrals extend to the free stream, these become

$$v_e = u_e \frac{\delta^*}{L} \frac{dL}{dx}, \quad (48)$$

and

$$\tau_w = \rho_e u_e^2 \frac{\theta}{L} \frac{dL}{dx}. \quad (49)$$

The last two equations are clearly not compatible if L is the same for both. To satisfy the condition $v_e/u_e = d\delta^*/dx$, it is necessary to take $L = \delta^*$. To satisfy the condition $\tau_w/\rho_e u_e^2 = d\theta/dx$, it is necessary to take $L = \theta$. In neither case is $L = \delta$ a satisfactory choice.

To illustrate the problem, some typical results according to these equations, with $L = \theta$, are compared in Figs. 9 and 10 to earlier results based on Eqs. (44) and (45). Experimental points now have a direct influence on the calculation, because they define the functions to be integrated. The distributions in the figures are therefore properly rounded in the vicinity of the boundary-layer edge, avoiding the corner which is present in the earlier results. There is a slight problem with Eqs. (46) and (47) at small values of y/θ , where the experimental values of M/M_e , u/u_e , and ρ/ρ_e are all larger (perhaps because of probe interference) than the values associated with the profile fit. The integrals thus become permanently biased during the passage through small values of y . However, the main source of the discrepancy in v/u outside the boundary layer is the fact that Eq. (48) requires $v_e/u_e = (\delta^*/\theta)d\theta/dx$, rather than the correct value $d\delta^*/dx$. When the difference $\theta dH/dx$ is estimated independently, using the tabulated material of the Appendix, the discrepancies in Fig. 9 are quite well accounted for. Because of these discrepancies, and because the wall-wake fit provides an unambiguous definition for δ , we consider the calculation based on Eqs. (44) and (45) to be superior.

IV. Surface-Friction Data

A. Floating-Element Balance

A floating-element balance used by Coles (1953) was recommissioned for use in the present experiments.* The only important design change was

*The expert assistance of George Tennant in preparing the balance is gratefully acknowledged.

in the method of achieving the null position for the element. The balance, shown in Figs. 11 and 12, is a sealed unit mounted in a 23.5 cm-diameter port flush with the ceiling plate in the 20-inch wind tunnel. The original element occupies a 10-cm diameter circle which is located 5.08 cm upstream of the port centerline, as indicated in Fig. 12.

The balance is a null device with the floating element supported by a four-flexure linkage. The total force on the element is inferred from the displacement required at the supporting beam to return the element to null. In the present configuration, the supporting beam is driven by a differential micrometer powered by a small variable-speed motor. Two independent measurements were made of the beam motion. The counter shown in Fig. 11 measured the rotation of the micrometer drive shaft and counted in units of 10^{-6} inches of axial displacement. In addition, a Schaevitz coil was mechanically linked to the beam through the drive wire. The null position of the element was monitored by a second Schaevitz coil, as in the original design. The demodulated output from the Schaevitz coils was low-pass filtered with a time constant of 0.25 sec. The dashpots shown in Fig. 11 were filled with Dow Corning 710 silicone oil having a viscosity $\nu = 5.0 \text{ cm}^2/\text{sec}$. A thermocouple measured the temperature of the balance chamber.

The rectangular floating element, shown in Fig. 12, is 0.622 cm in the streamwise direction and 3.785 cm in the cross-stream direction. The area of the element is thus $A = 2.356 \text{ cm}^2$. The gap is 0.007 cm upstream and downstream when the element is nulled, and 0.010 cm on each side. The element was flush with the surrounding surface within 0.0001 cm. No correction was made to account for the effect of the gap on the measured force.

The balance was calibrated using the technique described by Coles (1953). The beam displacement required to return the element to null was measured with the balance tilted at various angles with respect to the horizontal. These measurements were repeated after adding various small weights to the element, and the results were analyzed to yield the mass of the unweighted element and the spring constant for the flexures. Four angles were used between 0.0° and 0.6° , with weights of 0, 5, 10 and 20 grams. The spring constant was measured to be 73.98 gm/cm, with a maximum deviation of 2 parts in 1000.

The JPL 20-inch tunnel is a variable-density facility. The balance was located on the tunnel ceiling, which flexes with changes in free-stream static pressure. To compensate for the resulting zero offset in the surface-friction balance, the element was covered by a thin gasket-sealed plate, which was held in place by evacuating the balance chamber, and flow was established at the desired Mach number and Reynolds number. When the balance achieved thermal equilibrium, the null position of the element was measured. The flow was then bypassed, the element cover was removed, and flow was re-established at the same free-stream conditions. When thermal equilibrium was again achieved, the null position of the element was again measured. The difference between the beam positions required for null, with and without applied shearing stress, is a direct measure of the force on the element.

The measurement just described is not quite correct, because any differential pressure between the sealed balance chamber and the test section causes additional bending of the balance port. The resulting zero offset was determined with the tunnel off and with the test-section pressure set at appropriate values. The maximum correction applied to the data was 6.5 percent.

Finally, because the equilibrium temperature may not be the same for the various null measurements, effects of thermal distortion must also be considered. The zero offset from this source was measured separately; the maximum correction applied to the data was 0.4 percent. The streamwise force on the element due to free-stream pressure gradient is negligible.

Measurements using the balance were made at only one station, as indicated in Table 1. The data, together with the free-stream static and stagnation conditions, were recorded by the data-acquisition system. The surface-friction balance yields a direct measurement of the tangential stress on the floating element,

$$\tau_w = \frac{F}{A} \quad (50)$$

The associated friction coefficients,

$$C_f = 2 \frac{\tau_w}{\rho_e u_e^2} \quad (51)$$

are listed in Table 3.

B. Preston Tube

An independent estimate of surface friction was obtained from measurements with a Preston tube, a flat-faced circular cylinder in contact with the wall. For the JPL experiments, three probes were used, having outer diameters D of 0.082 cm, 0.162 cm, and 0.317 cm, with a ratio of inner to outer diameter of 0.60. The largest probe was tested only at station JPL-2. The probes were positioned at the wall by the traverse mechanism.

For the CIT experiments, a single Preston tube was used, having an outer diameter of 0.210 cm, with a ratio of inner to outer diameter of 0.76.

There is no concensus on the question of proper interpretation of Preston-tube data at supersonic speeds. For example, Hopkins and Keener (1966) took as the geometric parameter

$$Re_D = \frac{\rho_e u_e D}{\mu_e}, \quad (52)$$

and as the response parameter, the Mach number M_p implied by the ratio of Preston-tube pressure to local static pressure. They proposed, as a correlation between this parameter M_p and the surface friction coefficient C_f , the expression

$$f_2(T') Re_D^2 \left(\frac{M_p}{M_e} \right)^2 = 32.885 \left[f_2(T') Re_D^2 C_f \right]^{1.132}, \quad (53)$$

where

$$f_2(T') = \left(\frac{\mu_e}{\mu'} \right)^2 \frac{\rho'}{\rho_e}, \quad (54)$$

with μ' and ρ' evaluated at the reference temperature T' proposed by Sommer and Short (1955),

$$\frac{T'}{T_e} = 1 + 0.035 M_e^2 + 0.45 \left(\frac{T_w}{T_e} - 1 \right). \quad (55)$$

Values of local friction coefficient C_f calculated from these equations are included in Table 3 and are listed in more detail in Table A2 of the Appendix.

Bradshaw and Unsworth (1974) have taken the position that only wall quantities should appear in any Preston-tube correlation and that it is unrealistic to insist on an explicit formula for C_f . They took as a point of departure a recent survey by Allen (1973). Using Allen's own calibration data (but not other data considered by Allen), they proposed a formula representing Patel's low-speed calibration (1965), with an additive term to account for compressibility. The formula applies for adiabatic flow and for $50 < D^+ < 1000$, where

$$D^+ = \frac{Du_\tau}{\nu_w}, \quad (56)$$

and $\tau_w = \rho_w u_\tau^2$ as before.

Unfortunately, Allen has recently reported (1977) that his published friction measurements are incorrect, because of a defective or poorly calibrated balance. He did not repeat his experiment, but simply replaced the original measured values of surface friction by computed ones. He also made the corresponding revision in the Bradshaw-Unsworth formula (again using only his own revised calibration), with the final result

$$\begin{aligned} \frac{C_p}{C_f} = & 96 + 60 \log_{10} \left(\frac{D^+}{50} \right) + 23.7 \left[\log_{10} \left(\frac{D^+}{50} \right) \right]^2 \\ & + 10^4 M_\tau^2 \left[(D^+)^{0.30} - 2.38 \right], \end{aligned} \quad (57)$$

where

$$M_\tau^2 = \frac{u_\tau^2}{\gamma R T_w}, \quad (58)$$

and

$$C_p = 2 \frac{(p_p - p_s)}{\gamma_p M_e^2} \quad (59)$$

Here p_p is the pressure measured by the Preston tube and p_s is the ambient static pressure.

The present Preston-tube data have also been processed in terms of Eq. (57) to obtain the values of local friction coefficient C_f which are listed in Table 3 and in Table A2 of the Appendix*.

C. Friction-Law Scaling

It has been pointed out by Spalding and Chi (1964) and others that most analytical formulations for compressible turbulent boundary layers are reducible to a description of the surface friction in terms of the surface friction for an equivalent incompressible boundary layer at a different Reynolds number. The equivalence is usually expressed by two semi-empirical scaling functions F_f and F_θ , thus:

$$C_f^i = F_f C_f \quad (60)$$

and

$$Re_\theta^i = F_\theta Re_\theta \quad (61)$$

*The experiments described in the present report should eventually be viewed as a producer rather than as a consumer of Preston-tube calibration data. However, a full-scale critique of the Preston-tube technique for supersonic flow is outside the scope of this research, and the present measurements have therefore been interpreted as if no friction-balance data were available.

For the particular case of adiabatic flow, the scaling functions

$$F_f = \frac{\left(\frac{T_w}{T_e} - 1\right)}{\left[\sin^{-1}\left(1 - \frac{T_e}{T_w}\right)^{1/2}\right]^2} = \frac{1}{(1 - m^2)} \left(\frac{m}{\sin^{-1} m}\right)^2, \quad (62)$$

and

$$F_\theta = \frac{\mu_e}{\mu_w}, \quad (63)$$

were first proposed by Wilson (1949). Use of Eq. (63) for flow with heat transfer was later recommended by Van Driest (1955) and is sometimes referred to as Van Driest II. For adiabatic flow, given M_e and r (and hence F_f and F_θ), and given also Re_θ , the surface friction is determined by computing Re_θ^i from Eq. (61) by looking up the associated value for C_f^i , using some convenient low-speed friction law; and finally by computing C_f from Eq. (60). That is,

$$C_f = \frac{1}{F_f} C_f^i \left(Re_\theta^i\right) = \frac{1}{F_f} C_f^i \left(F_\theta Re_\theta\right). \quad (64)$$

A "convenient low-speed friction law" is implicit in the survey by Coles (1968), who recommends the value $\Pi = 0.62$ for flow at constant pressure when $Re_\theta^i > 5000$. For lower Reynolds numbers, we multiply $\Pi(\delta u_\tau/\nu)$ from Table 2 of Coles (1962, Appendix A) by $0.62/0.55$. With $\delta u_\tau/\nu$ as independent variable, the quantities u_e/u_τ and $C_f^i = 2 \left(u_\tau/u_e\right)^2$ follow immediately from the local friction law (21) above. Finally, we compute $Re_{\delta^*}^i$ and Re_θ^i from Eqs. (7) and (8) of Coles (1968), after replacing Re_{δ^*} by $Re_{\delta^*} - 65$ to take account of the real profile in the sublayer. The

result of these calculations is recorded in Table 4.

Values calculated for C_f from Eq. (64), using interpolation in Table 4 to define the function $C_f^i(Re_\theta^i)$, are included in Table 3.

V. Discussion and Conclusions

According to Table 3, five different methods have been used to measure or to estimate the local friction coefficient C_f for the present experiments. Three of these methods (Van Driest scaling, Preston tube, friction-law scaling) depend on some empirical means for taking account of compressibility. In particular, the friction-law scaling of Section IV-C replaces the measured Re_θ by Re_θ^i and the measured or estimated C_f by C_f^i . When the data of Table 3 are subjected to this same scaling, they appear as shown in Fig. 13. The solid curves represent low-speed experience according to Table 4. Any discrepancy between the data and the solid curves should not be interpreted as error, because the friction-law scaling itself would then have to be viewed as error-free. This scaling is in fact of uncertain accuracy, and is used primarily to remove most of the effects of Mach number in the data, so that one technique for evaluating C_f can be readily compared with another. The required displacements from (C_f, Re_θ) to (C_f^i, Re_θ^i) are indicated by the line segments next to the lowest curve in Fig. 13. These displacements are not very substantial, because the Mach numbers for the present experiments are relatively low.

We consider the floating-element friction data to be the most reliable data in the figure. For the estimates of C_f from $d\theta/dx$, the scatter is large, as expected. The largest scatter, however, is in the Preston-tube data, indicating that this technique needs further development.

Of the two Preston-tube correlations, the one by Bradshaw and Unsworth (as revised by Allen; see Section IV B) underestimates C_f slightly, especially at $M_e = 2.2$. The correlation by Hopkins and Keener is satisfactory except at $M_e = 2.2$, where it overestimates C_f by a large amount. The profile fit gives values for C_f which are systematically a little high (except for the CIT measurements), with a maximum discrepancy of about 6 percent at $M_e = 2.2$.

In general, scaling of the measured mean-velocity profiles according to the Van Driest version of the mixing-length theory (Eq. (18)) seems to be quite successful. The scaled profiles can be well represented by conventional low-speed wall-wake similarity laws. Except for discontinuities in slope at the edge of the boundary layer, the inferred profiles for v/u and τ/τ_w provide a quite acceptable standard for interpretation of the LDV measurements reported in Part II of this work. Estimates for v/u and τ/τ_w based on the assumption of similarity in y/δ or y/θ are less satisfactory.

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| Station | Location (cm from floating- element balance) | Pitot Tube | Preston Tube | Balance | LDV |
|---------|--|------------|--------------|---------|-----|
| JPL-1 | -48.4 | x | | | |
| JPL-2 | -26.2 | x | x | | x |
| JPL-3 | - 7.6 | x | | | |
| JPL-4 | 0.0 | x | x | x | x |
| JPL-5 | 7.6 | x | | | |

Table 1. High-Speed Flow Measurements
JPL 20-Inch Wind Tunnel

| Station | Location (cm from leading edge) | Pitot Tube | Pitot Rake | Preston Tube | LDV |
|---------|---------------------------------------|------------|------------|--------------|-----|
| CIT-1 | 30.4 | | x | x | |
| CIT-2 | 60.9 | | x | x | |
| CIT-3 | 91.4 | | x | x | |
| CIT-4 | 152.4 | x | | x | |
| CIT-5 | 167.6 | x | | x | |
| CIT-6 | 182.8 | x | | x | x |
| CIT-7 | 198.1 | x | | x | |
| CIT-8 | 213.3 | x | | x | |
| CIT-9 | 228.6 | x | | x | |

Table 2. Low-Speed Flow Measurements
CIT Merrill Wind Tunnel

TABLE 3.

SKIN FRICTION SUMMARY

| STATION | ME | RE-THETA | CF | | | | | BALANCE | COMPUTED |
|---------|-------|----------|---------|---------|------------------|------------------|---------|---------|----------|
| | | | 2*DT0X | FIT | PRESTON (H/K) | PRESTON (B/U) | | | |
| CIT-1 | .1050 | 1029. | | | .004057 | .003911 | | | .004410 |
| CIT-2 | .1050 | 1875. | | | .003458 | .003331 | | | .003703 |
| CIT-3 | .1050 | 2798. | | | .003087 | .002982 | | | .003321 |
| CIT-4 | .1058 | 5932. | | .002787 | .002630 | .002715 | | | .002826 |
| CIT-5 | .1072 | 6209. | | .002786 | .002553 | .002637 | | | .002808 |
| CIT-6 | .1031 | 6604. | .002768 | .002756 | .002683 | .002772 | | | .002782 |
| CIT-7 | .1036 | 7270. | | .002689 | .002736 | .002825 | | | .002739 |
| CIT-8 | .1052 | 7475. | | .002689 | .002611 | .002700 | | | .002725 |
| CIT-9 | .1070 | 8068. | | .002676 | .002493 | .002575 | | | .002687 |
| JPL-1 | .5927 | 18870. | | .002179 | | | | | .002249 |
| JPL-2 | .5927 | 20180. | | .002201 | .002173 | .002169 | | | .002227 |
| JPL-3 | .5986 | 22190. | | .002196 | | | | | .002194 |
| JPL-4 | .6018 | 22400. | .002096 | .002198 | .002109 | .002106 | .002165 | | .002190 |
| JPL-5 | .5962 | 22300. | | .002195 | | | | | .002192 |
| JPL-1 | .5973 | 31460. | | .002090 | | | | | .002072 |
| JPL-2 | .5964 | 34330. | | .002057 | .002012 | .002015 | | | .002048 |
| JPL-3 | .5952 | 37280. | | .002056 | | | | | .002025 |
| JPL-4 | .5931 | 36470. | .001992 | .002065 | .001983 | .001985 | .001994 | | .002032 |
| JPL-5 | .5935 | 37930. | | .002041 | | | | | .002020 |
| JPL-1 | .7958 | 19770. | | .002136 | | | | | .002177 |
| JPL-2 | .7882 | 21850. | | .002109 | .002139 | .002090 | | | .002148 |
| JPL-3 | .8049 | 23540. | | .002132 | | | | | .002117 |
| JPL-4 | .8016 | 23710. | .002042 | .002120 | .002066 | .002027 | .002086 | | .002116 |
| JPL-5 | .7995 | 24570. | | .002105 | | | | | .002103 |
| JPL-1 | .7980 | 33940. | | .002005 | | | | | .001998 |
| JPL-2 | .7943 | 37360. | | .001993 | .001971 | .001935 | | | .001974 |
| JPL-3 | .7940 | 40190. | | .001987 | | | | | .001953 |
| JPL-4 | .7921 | 41090. | .001942 | .001978 | .001920 | .001884 | .001942 | | .001947 |
| JPL-5 | .7919 | 42600. | | .001953 | | | | | .001936 |

TABLE 3. (CONT.)

| STATION | ME | RE-THETA | CF | | | | |
|---------|--------|----------|---------|---------|------------------|------------------|------------------|
| | | | 2*DTDX | FIT | PRESTON (H/K) | PRESTON (B/U) | BALANCE COMPUTED |
| JPL-1 | .9664 | 18650. | | .002108 | | | .002144 |
| JPL-2 | .9669 | 20890. | | .002065 | .002118 | .002024 | .002103 |
| JPL-3 | .9719 | 22720. | | .002097 | | | .002076 |
| JPL-4 | .9672 | 22840. | .002054 | .002081 | .002081 | .002008 | .002076 |
| JPL-5 | .9651 | 23850. | | .002067 | | | .002062 |
| JPL-1 | .9648 | 32330. | | .001970 | | | .001963 |
| JPL-2 | .9626 | 36250. | | .001940 | .001932 | .001863 | .001930 |
| JPL-3 | .9613 | 38500. | | .001953 | | | .001915 |
| JPL-4 | .9637 | 39900. | .002014 | .001925 | .001870 | .001810 | .001905 |
| JPL-5 | .9606 | 41550. | | .001911 | | | .001894 |
| JPL-2 | 1.3141 | 19780. | | .002000 | .001906 | .001793 | .001994 |
| JPL-3 | 1.3215 | 21880. | | .001983 | | | .001958 |
| JPL-4 | 1.3197 | 21900. | .001854 | .001983 | .001913 | .001808 | .001958 |
| JPL-5 | 1.3151 | 24190. | | .001959 | | | .001931 |
| JPL-2 | 1.3082 | 37230. | | .001844 | .001778 | .001701 | .001802 |
| JPL-3 | 1.3173 | 37550. | | .001858 | | | .001796 |
| JPL-4 | 1.3125 | 37900. | .001750 | .001860 | .001802 | .001697 | .001795 |
| JPL-5 | 1.3130 | 40210. | | .001832 | | | .001782 |
| JPL-2 | 2.1722 | 23070. | | .001656 | .001740 | .001478 | .001607 |
| JPL-3 | 2.1666 | 23520. | | .001649 | | | .001603 |
| JPL-4 | 2.1642 | 24690. | .001532 | .001633 | .001683 | .001497 | .001590 |
| JPL-5 | 2.1722 | 25060. | | .001624 | | | .001583 |
| JPL-2 | 2.1812 | 38050. | | .001534 | .001613 | .001385 | .001476 |
| JPL-3 | 2.1737 | 40570. | | .001530 | | | .001462 |
| JPL-4 | 2.1820 | 41600. | .001444 | .001527 | .001573 | .001378 | .001454 |
| JPL-5 | 2.1797 | 43060. | | .001507 | | | .001447 |

Table 4.

LOW-SPEED FRICTION LAW

| DELTA-PLUS | PI | UE/UT | CF | RE-DSTAR | RE-THETA |
|------------|------|-------|---------|----------|----------|
| 240. | .000 | 18.37 | .005928 | 650. | 430. |
| 300. | .135 | 19.57 | .005221 | 896. | 607. |
| 400. | .259 | 20.88 | .004588 | 1294. | 896. |
| 500. | .338 | 21.81 | .004206 | 1697. | 1189. |
| 600. | .406 | 22.58 | .003922 | 2122. | 1498. |
| 800. | .485 | 23.67 | .003570 | 2962. | 2114. |
| 1000. | .541 | 24.49 | .003335 | 3824. | 2749. |
| 1500. | .598 | 25.75 | .003016 | 5910. | 4308. |
| 2000. | .620 | 26.56 | .002834 | 7967. | 5865. |
| 3000. | .620 | 27.55 | .002635 | 11920. | 8908. |
| 4000. | .620 | 28.25 | .002505 | 15870. | 11980. |
| 5000. | .620 | 28.80 | .002412 | 19820. | 15060. |
| 6000. | .620 | 29.24 | .002339 | 23770. | 18160. |
| 8000. | .620 | 29.94 | .002230 | 31680. | 24380. |
| 10000. | .620 | 30.49 | .002152 | 39580. | 30640. |
| 15000. | .620 | 31.48 | .002018 | 59330. | 46380. |
| 20000. | .620 | 32.18 | .001931 | 79090. | 62210. |
| 30000. | .620 | 33.17 | .001818 | 118600. | 94070. |

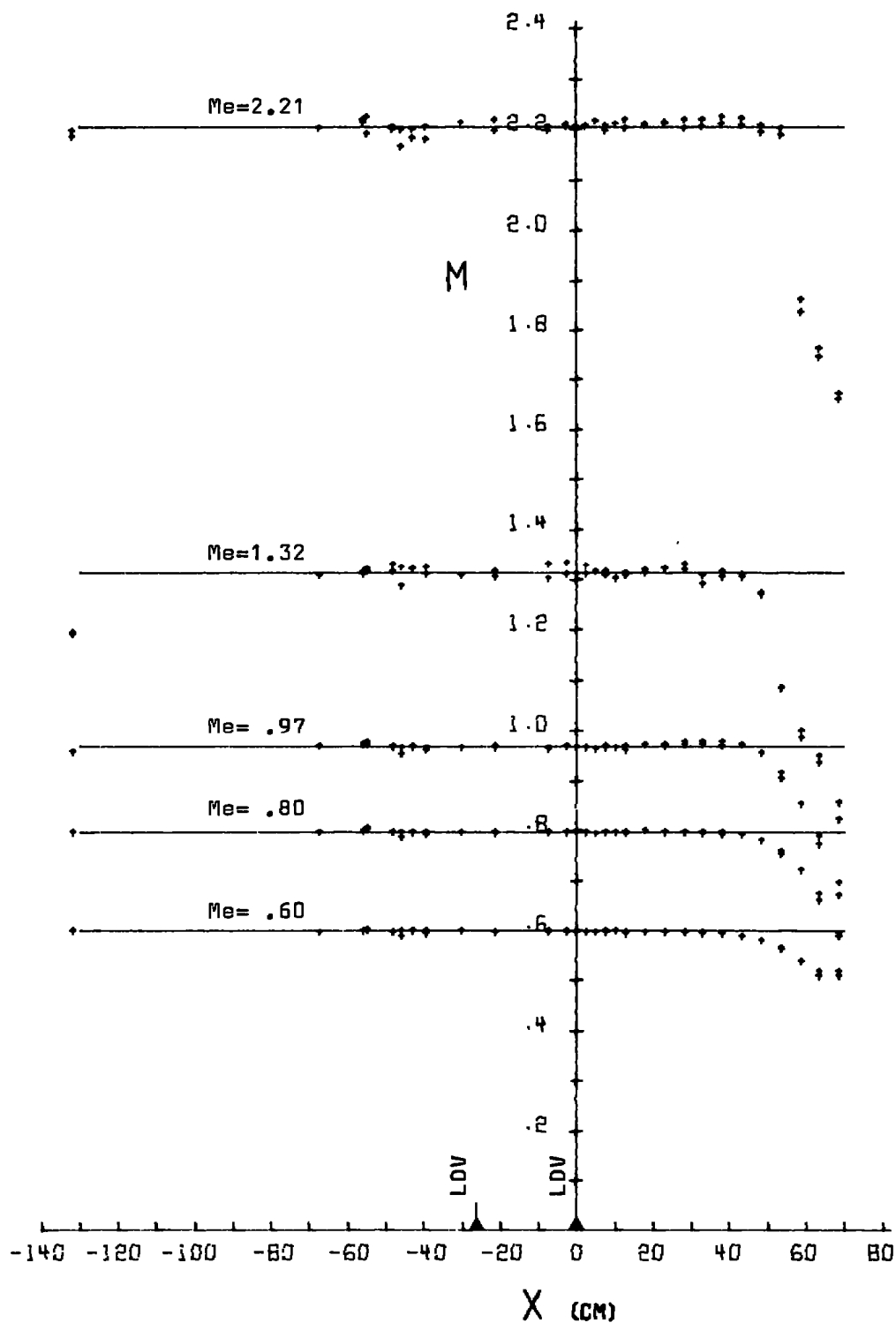


Figure 1. Free-stream Mach-Number Distribution, $Re_{\theta}=40,000$.
JPL 20-inch Wind Tunnel

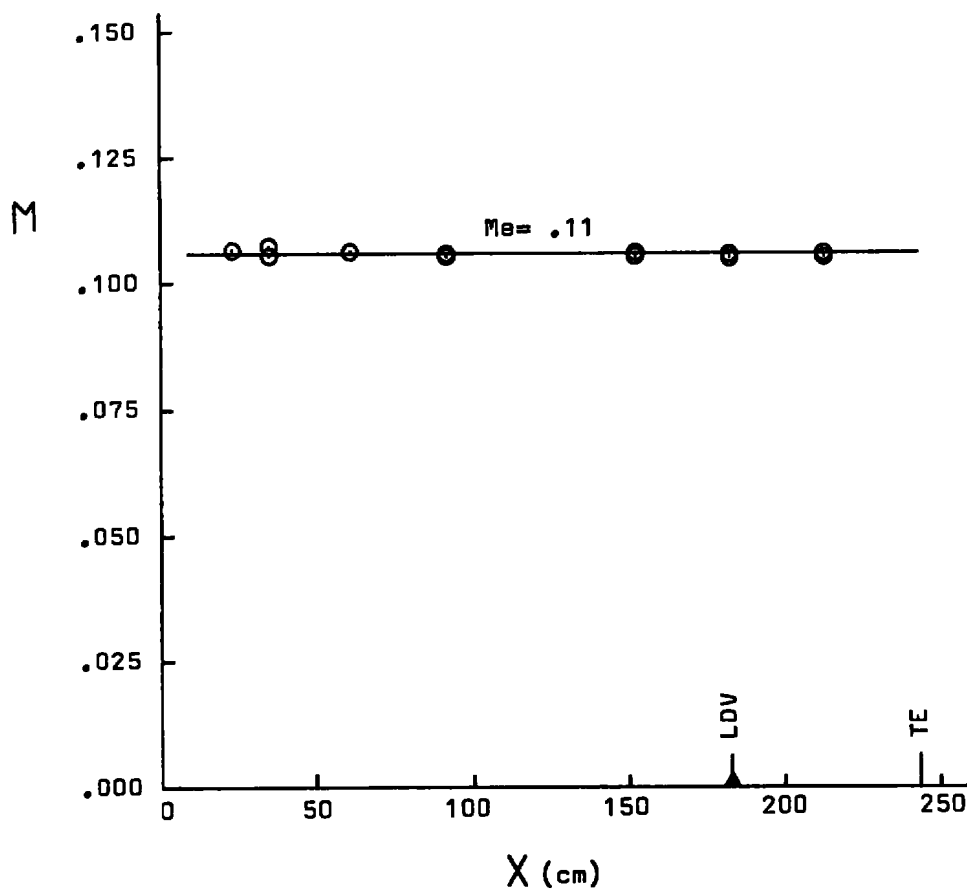


Figure 2. Free-stream Mach Number Distribution.
CIT Merrill Wind Tunnel

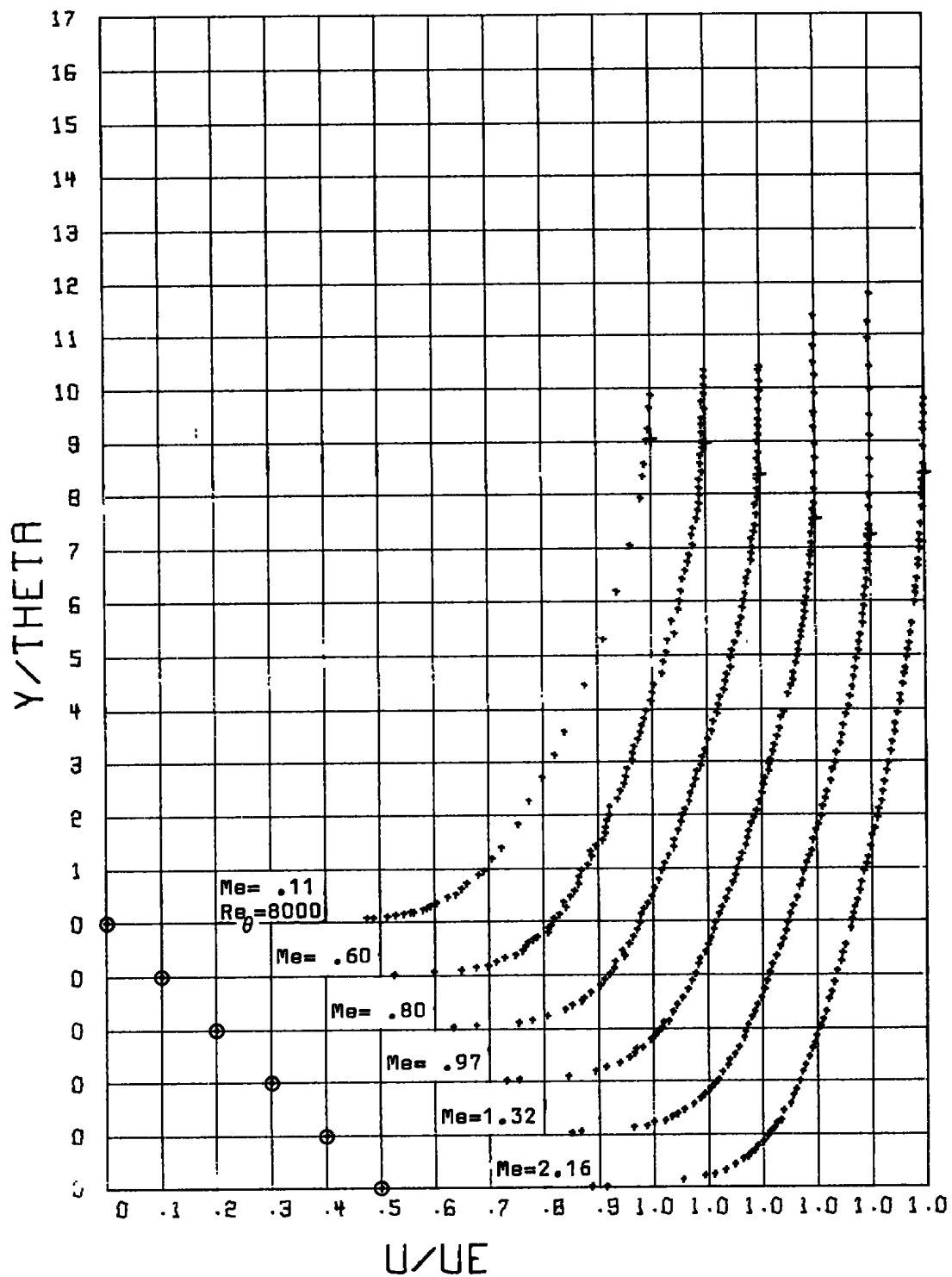
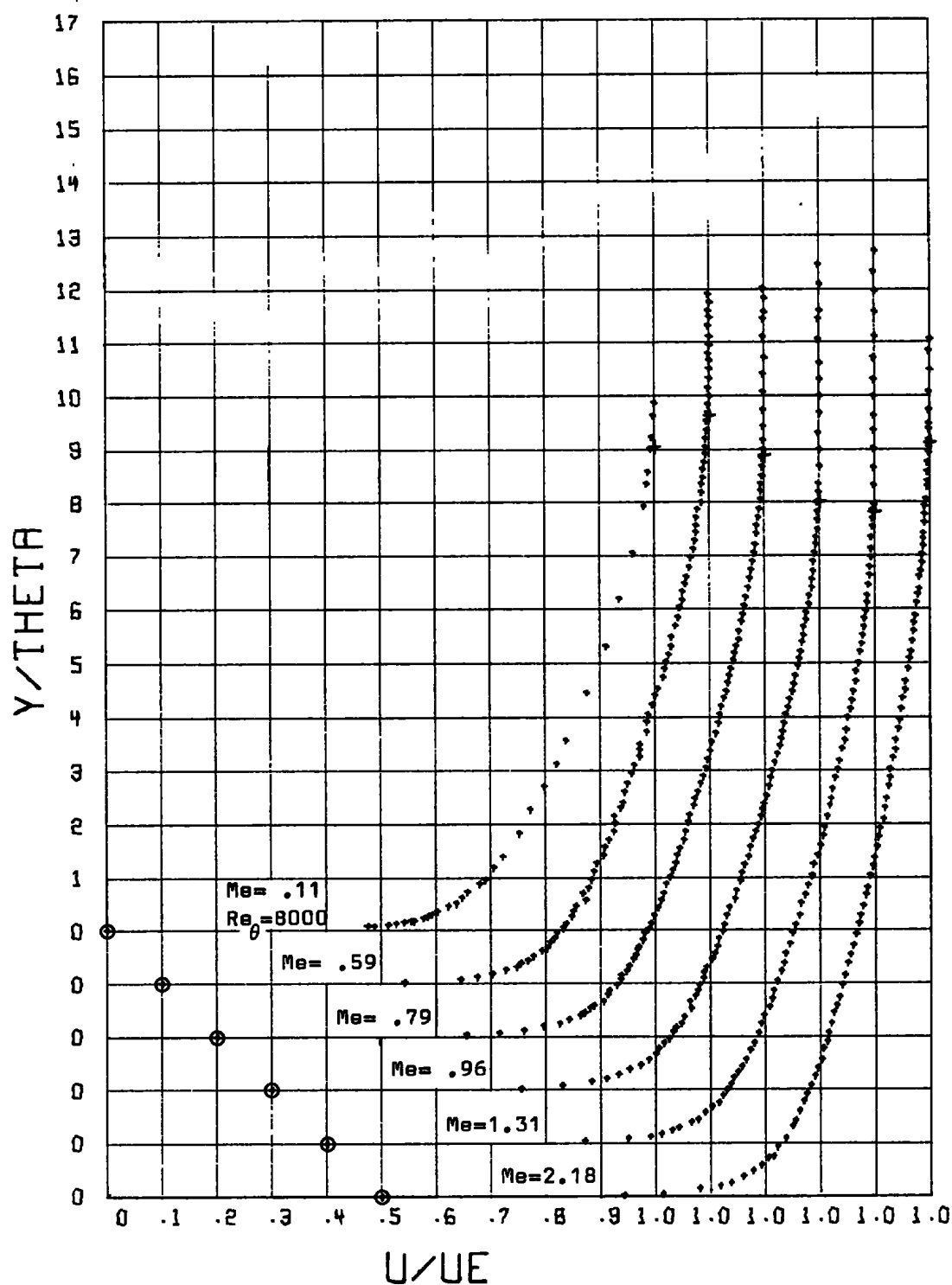


Figure 3. Mean Velocity Profiles. $Re_\theta = 23,000$

Figure 4. Mean Velocity Profiles. $Re_\theta = 40,000$

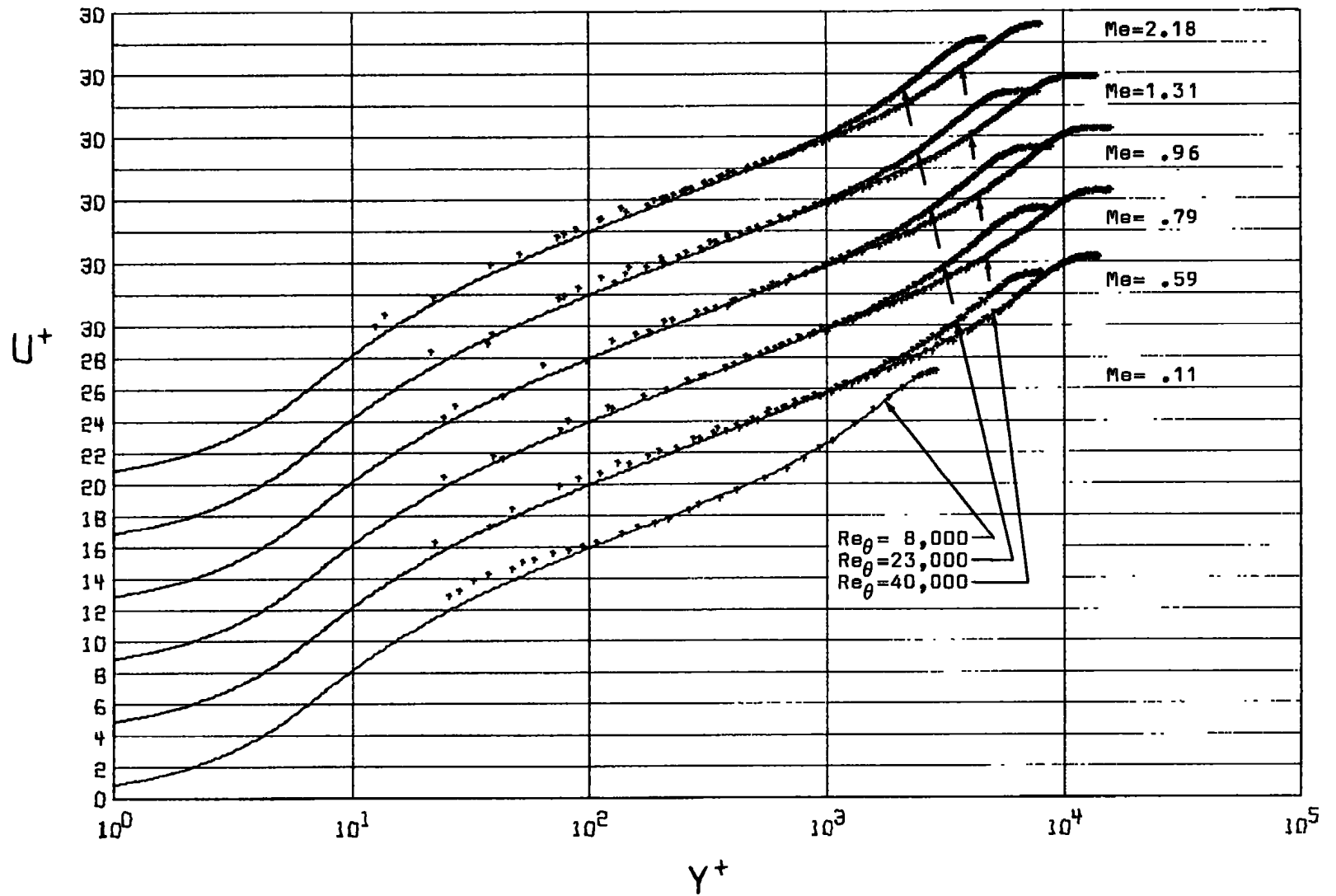


Figure 5. Mean Velocity Profiles with Van Driest Scaling.

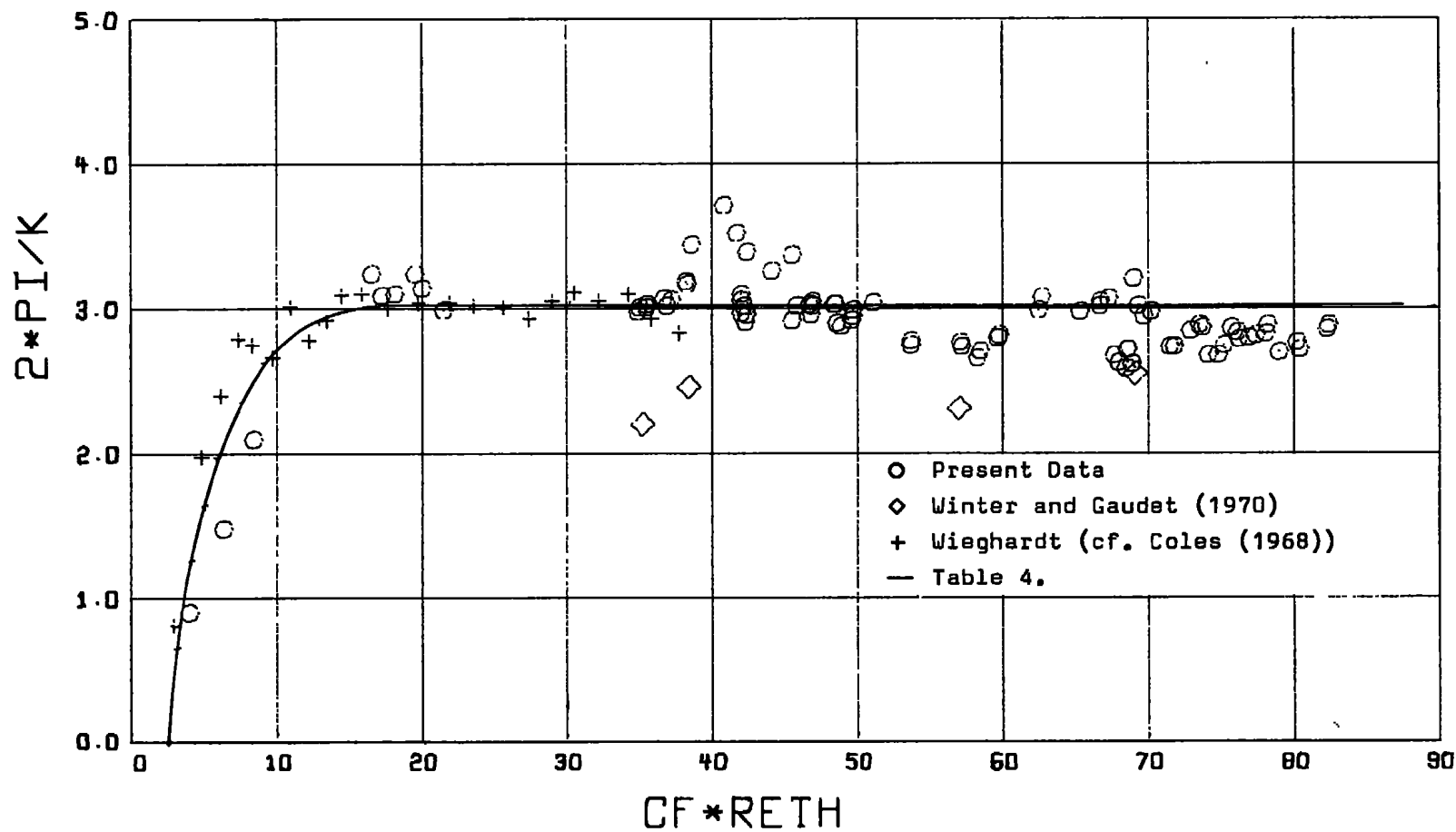


Figure 6. The Magnitude of the Wake Component with Van Driest Scaling.

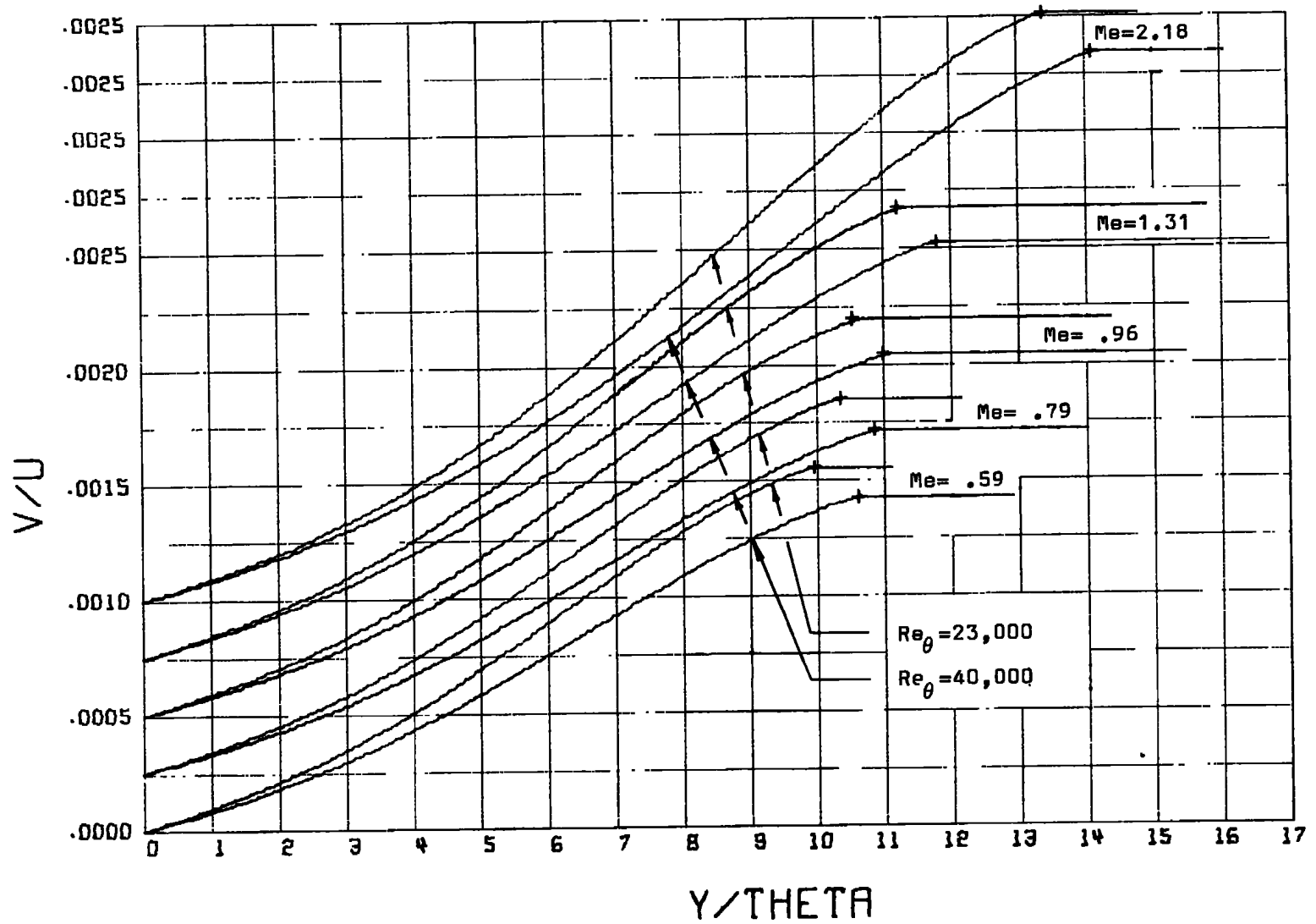


Figure 7. Distribution of Normal Velocity
According to Equation (38).

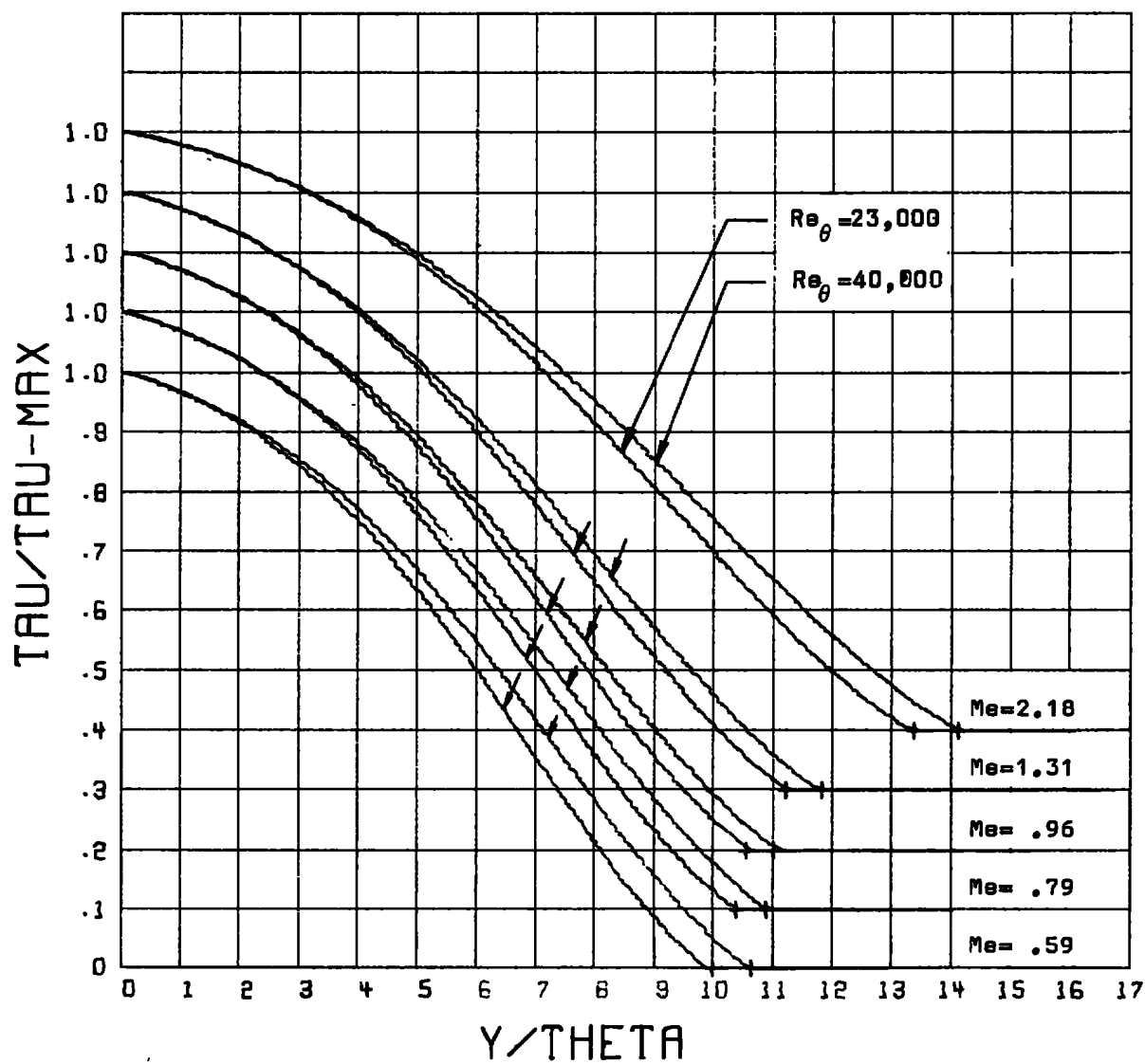


Figure 8. Distribution of Shearing Stress
According to Equation (37).

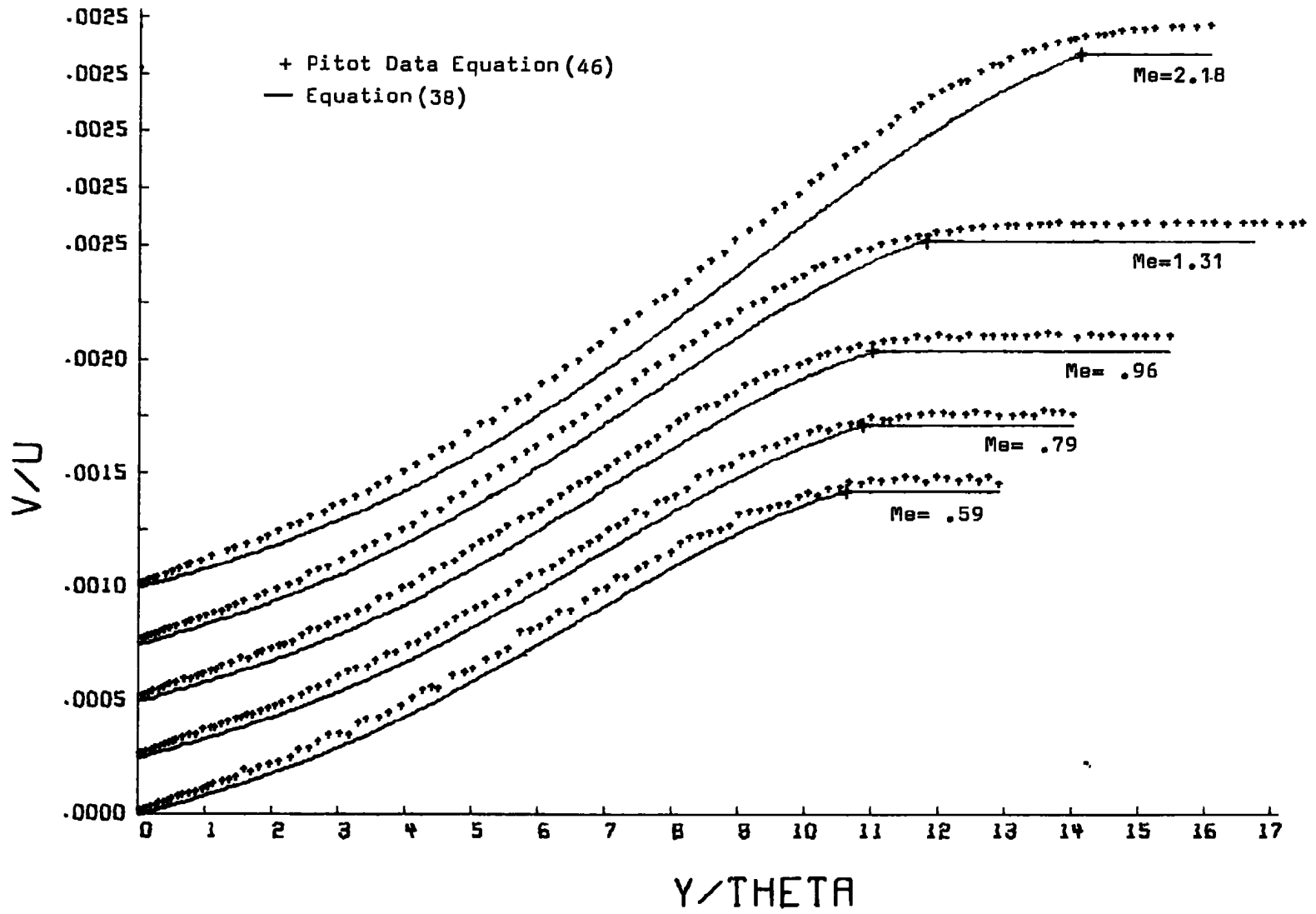


Figure 9. Comparison Between Direct Integration of Pitot Data and Integration Using the Fitted Profile. $Re_\theta = 40,000$

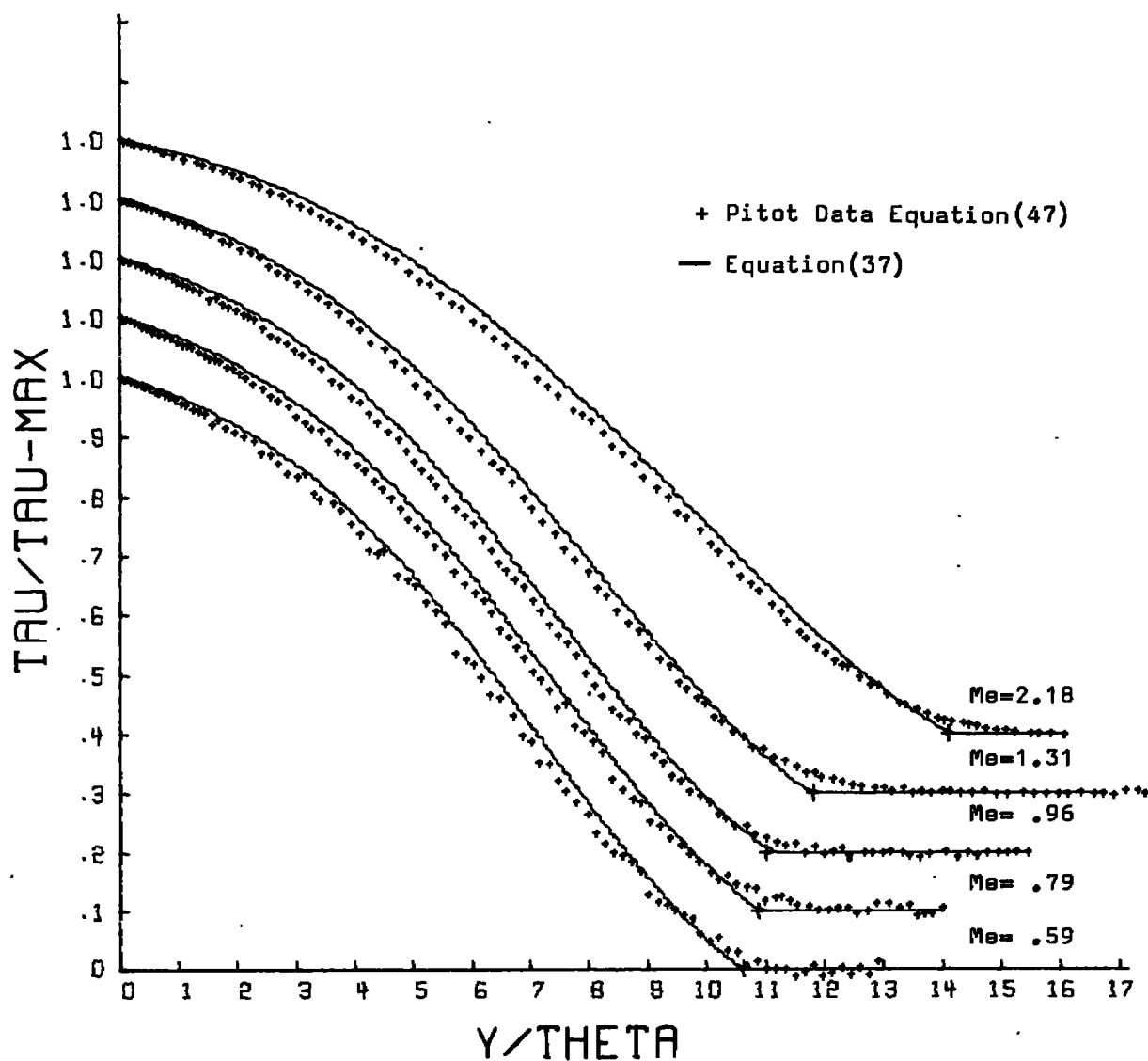


Figure 10. Comparison Between Direct Integration of Pitot Data and Integration Using the Fitted Profile.
 $Re_\theta=40,000$

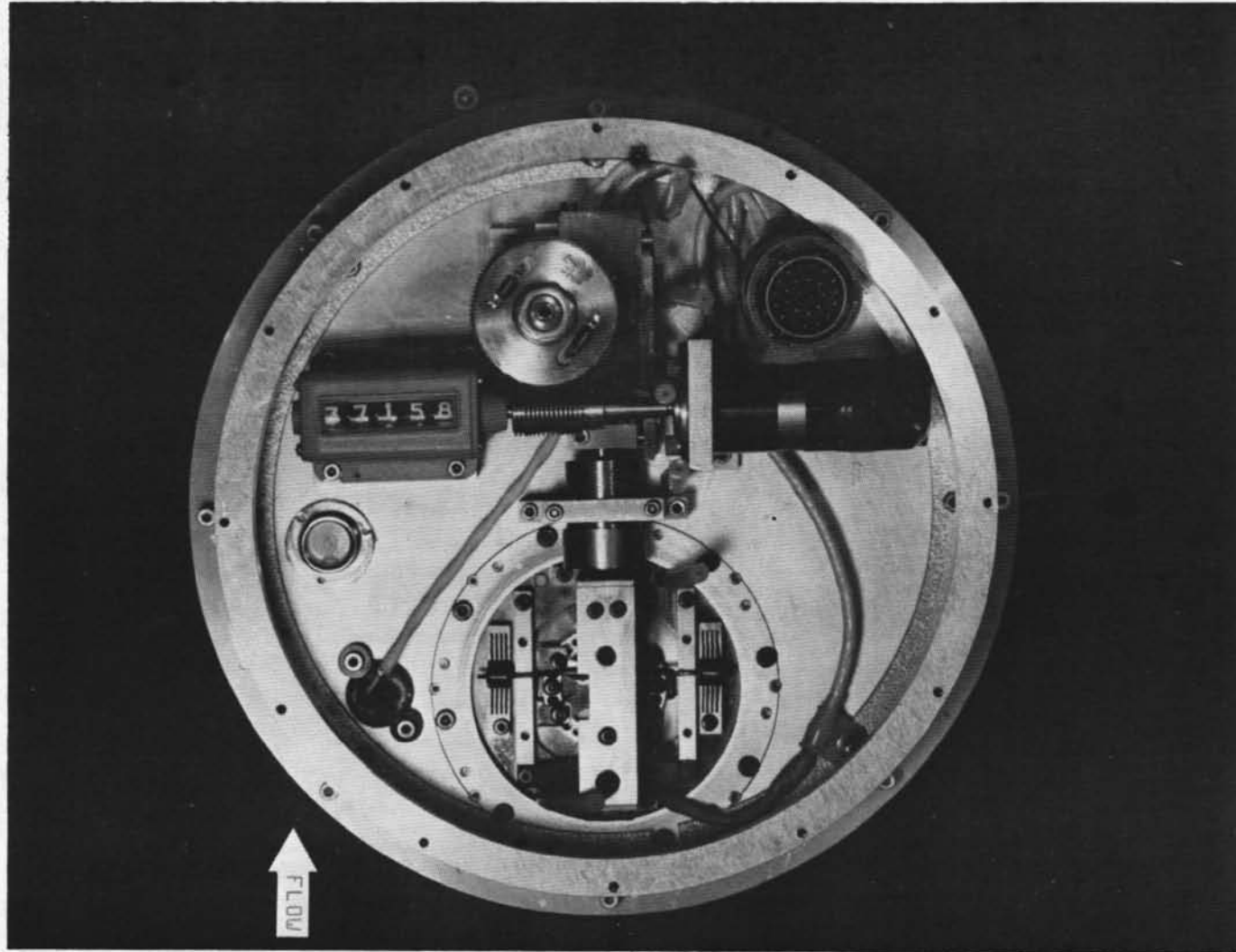


Figure 11. Floating-Element Balance.

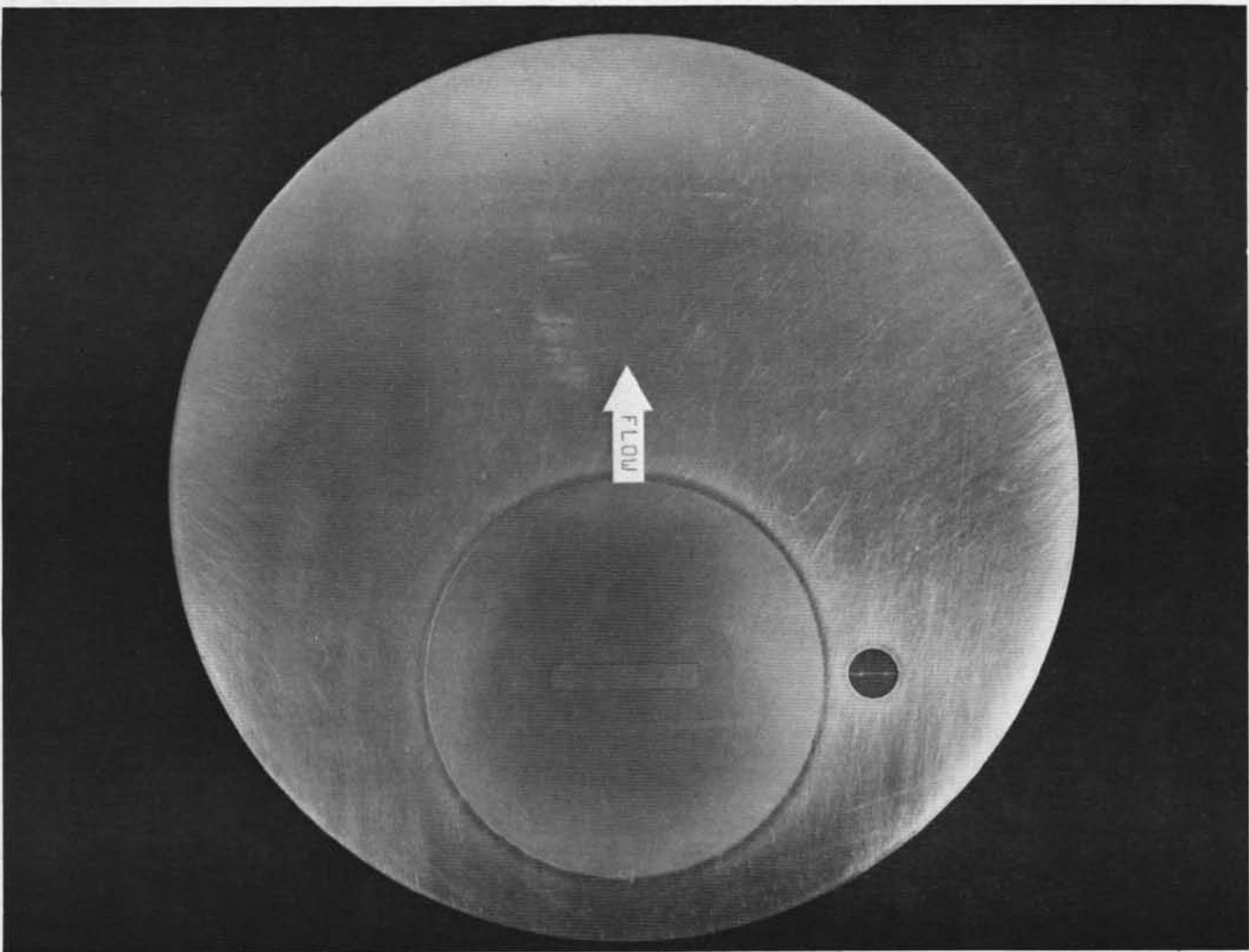


Figure 12. Floating-Element Balance.

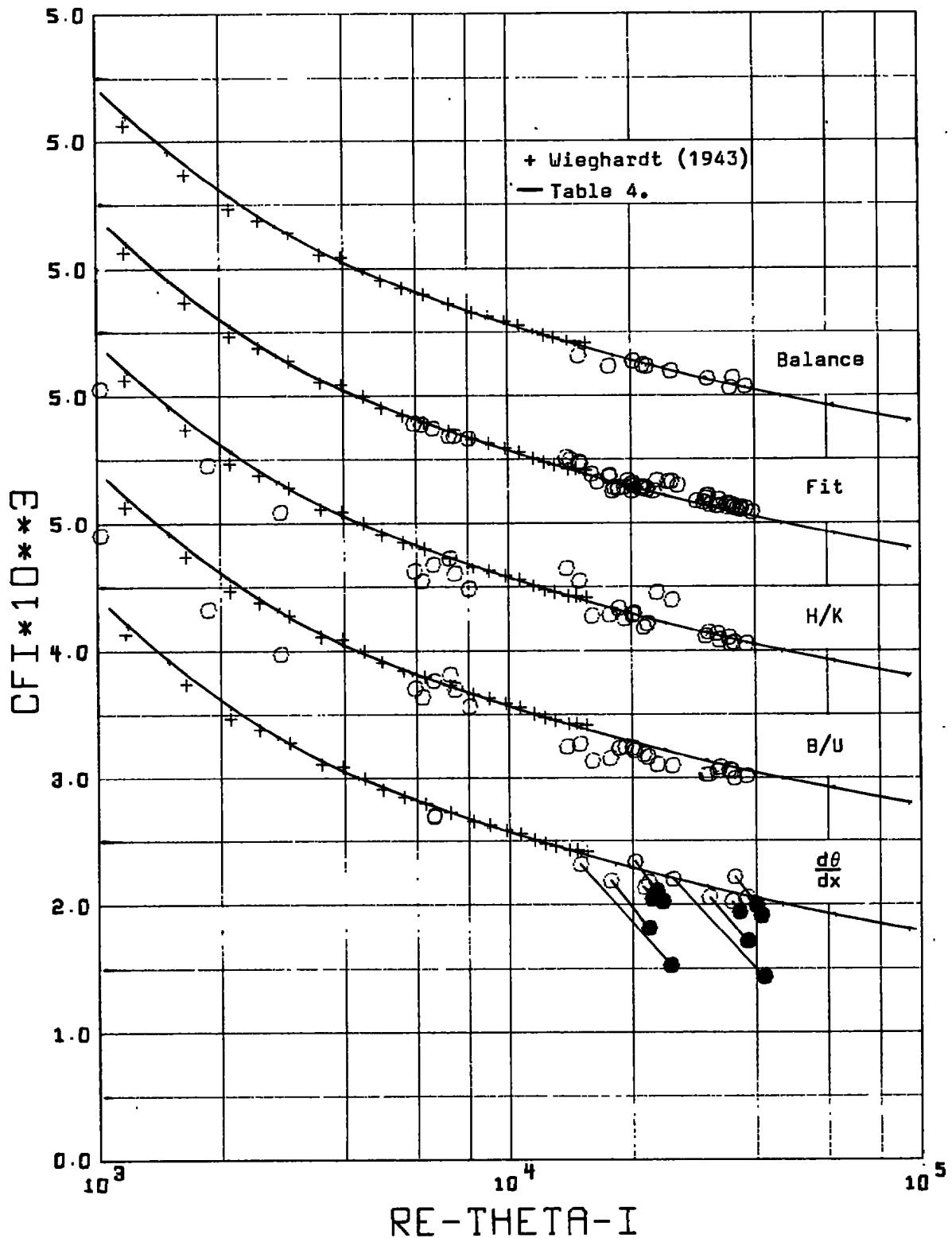


Figure 13. The Surface Friction as a Function of Reynolds Number.

Appendix

Tabulation of Experimental Data

Table A1

Table A1 summarizes various parameters for the profiles obtained from Pitot-tube surveys at the stations listed in Tables 1 and 2 of the main text. The quantities u_τ , Π , and δ are derived from the least-squares fit of each profile to the wall-wake formula,

$$\frac{u^*}{u_\tau} = \frac{1}{\kappa} \ln \frac{yu_\tau}{v_w} + c + 2 \frac{\Pi}{\kappa} \sin^2 \left(\frac{\pi y}{2 \delta} \right) , \quad (19)$$

where u^* is velocity scaled according to Van Driest,

$$u^* = \int_0^u \left(\frac{\rho}{\rho_w} \right)^{1/2} du . \quad (11)$$

The two integral thicknesses δ^* and θ are defined by

$$\delta^* = \int_0^\delta \left(1 - \frac{\rho u}{\rho_e u_e} \right) dy , \quad (4)$$

and by

$$\theta = \int_0^\delta \frac{\rho u}{\rho_e u_e} \left(1 - \frac{u}{u_e} \right) dy . \quad (5)$$

The quantity H is the ratio δ^*/θ .

Table A2

Table A2 contains Preston-tube data, including probe diameter D, pressure coefficient

$$C_p = 2 \frac{(p_p - p_s)}{\gamma p_s M_e^2} , \quad (59)$$

and friction coefficient, as inferred by two different correlation methods.

The method of Hopkins and Keener (1966), denoted by H/K, uses the formula

$$f_2(T') Re_D^2 \left(\frac{M_p}{M_e} \right)^2 = 32.885 \left[f_2(T') Re_D^2 C_f \right]^{1.132} , \quad (53)$$

which is explicitly soluble for C_f . The quantity M_p is the Mach number implied by C_p , and the quantities Re_D and $f_2(T')$ are defined by Eqs. (52) and (54) of the main text. The method of Bradshaw and Unsworth (1974) as revised by Allen (1977), denoted by B/U, uses the formula

$$\begin{aligned} \frac{C_p}{C_f} = & 96 + 60 \log_{10} \left(\frac{D^+}{50} \right) + 23.7 \left[\log_{10} \left(\frac{D^+}{50} \right) \right]^2 \\ & + 10^4 M_\tau^2 \left[(D^+)^{0.30} - 2.38 \right] . \end{aligned} \quad (57)$$

This formula is soluble for C_f only by iteration, since the quantities D^+ and M_τ both depend on C_f . These quantities are defined by Eqs. (56) and (58) of the main text.

Table A3

Table A3 includes estimates of the pressure-gradient parameter

$$\text{BETA} = \frac{\theta}{\gamma M_e^2} \frac{1}{P} \frac{dP}{dx} , \quad (\text{A1})$$

and the momentum-thickness derivative

$$\text{DTDx} = \frac{d\theta}{dx} . \quad (\text{A2})$$

These are assigned to stations CIT-6 or JPL-4 as appropriate. The quantity

$$\text{MOMB} = \frac{2}{C_f} \frac{d\theta}{dx} , \quad (\text{A3})$$

where C_f is the value measured using the floating-element balance, should equal unity if the experiment is free of error.

Tables A4-A14

Tables A4-A14 and the associated Figs. A1-A44 are a detailed record of data obtained from the Pitot-tube surveys. Each table heading includes the integral properties δ^* and θ for the profile, together with the friction coefficient C_f measured using the floating-element balance, where applicable (i.e., station JPL-4). Listed next are the profile parameters u_τ , Π , δ , from the profile fit, with the associated friction coefficient

$$C_f = 2 \frac{\rho_w}{\rho_e} \left(\frac{u_\tau}{u_e} \right)^2 . \quad (\text{22})$$

The range of y used in the fit is specified as YMIN, YMAX. The mean square deviation of the fitted data from the wall-wake formula is given as CHISQR. The variable for this calculation is the Van Driest velocity u^*/u_e .

The body of the tables lists the distance from the wall as y , as y/θ , and as

$$Y\text{-PLUS} = \frac{yu_\tau}{v_w} . \quad (A4)$$

Also listed are the local Mach number M , density ρ , and velocity u (all normalized by the corresponding free-stream values), and the Van Driest velocity

$$U\text{-PLUS} = \frac{u^*}{u_\tau} . \quad (A5)$$

Finally, the tables give the shearing stress τ/τ_w and the normal velocity v/u computed from

$$\frac{\tau}{\tau_w} = 1 - \left(\frac{2Q - \frac{u}{u_e} P}{2Q_e - P_e} \right) , \quad (37)$$

and

$$\frac{v}{u} = \frac{\tau_w}{\rho_e u_e^2} \frac{\rho_e u_e}{\rho u} \frac{P}{(2Q_e - P_e)} , \quad (38)$$

where P and Q are definite integrals defined by Eqs. (44) and (45) of the main text.

Table A1.

INTEGRAL PROPERTIES OF THE BOUNDARY LAYER

| STATION | MF | RF-THETA | U/E (M/SEC) | U/TAU (M/SEC) | P1 | DELTA (CM) | DELTA-STAR (CM) | THETA (CM) | H |
|---------|-------|----------|----------------|------------------|-------|---------------|--------------------|---------------|-------|
| CIT-4 | .1058 | 5932. | 37.25 | 1.392 | .6642 | 2.402 | .3572 | .2683 | 1.331 |
| CIT-5 | .1072 | 6209. | 38.01 | 1.420 | .6346 | 2.584 | .3759 | .2843 | 1.322 |
| CIT-6 | .1031 | 6604. | 37.34 | 1.387 | .6374 | 2.656 | .3860 | .2924 | 1.320 |
| CIT-7 | .1036 | 7270. | 35.91 | 1.318 | .6643 | 3.018 | .4404 | .3328 | 1.323 |
| CIT-8 | .1052 | 7475. | 37.42 | 1.373 | .6453 | 3.149 | .4545 | .3439 | 1.321 |
| CIT-9 | .1070 | 8068. | 37.79 | 1.393 | .6139 | 3.406 | .4814 | .3659 | 1.315 |
| JPL-1 | .5927 | 18870. | 201.05 | 6.840 | .7613 | 2.482 | .3796 | .2604 | 1.457 |
| JPL-2 | .5927 | 20180. | 202.47 | 6.922 | .6686 | 2.853 | .4179 | .2902 | 1.439 |
| JPL-3 | .5986 | 22190. | 202.13 | 6.907 | .6224 | 3.044 | .4333 | .3028 | 1.430 |
| JPL-4 | .6018 | 22400. | 204.91 | 7.007 | .5908 | 3.167 | .4531 | .3177 | 1.426 |
| JPL-5 | .5962 | 22300. | 203.19 | 6.941 | .5946 | 3.264 | .4553 | .3201 | 1.422 |
| JPL-1 | .5973 | 31460. | 205.88 | 6.863 | .6124 | 2.412 | .3325 | .2344 | 1.418 |
| JPL-2 | .5964 | 34330. | 208.25 | 6.886 | .6124 | 2.768 | .3803 | .2689 | 1.414 |
| JPL-3 | .5952 | 37280. | 205.97 | 6.809 | .5733 | 2.944 | .3948 | .2801 | 1.409 |
| JPL-4 | .5931 | 36470. | 207.02 | 6.857 | .5509 | 3.056 | .4039 | .2876 | 1.404 |
| JPL-5 | .5935 | 37930. | 207.38 | 6.828 | .5760 | 3.161 | .4218 | .3003 | 1.404 |
| JPL-1 | .7958 | 19770. | 264.47 | 9.115 | .7221 | 2.305 | .3655 | .2338 | 1.562 |
| JPL-2 | .7882 | 21850. | 263.34 | 9.011 | .6917 | 2.669 | .4124 | .2666 | 1.546 |
| JPL-3 | .8049 | 23540. | 266.29 | 9.180 | .5994 | 2.860 | .4221 | .2748 | 1.535 |
| JPL-4 | .8016 | 23710. | 267.51 | 9.192 | .6145 | 2.961 | .4395 | .2857 | 1.538 |
| JPL-5 | .7995 | 24570. | 266.60 | 9.125 | .6243 | 3.063 | .4564 | .2964 | 1.539 |
| JPL-1 | .7980 | 33940. | 271.81 | 9.080 | .6306 | 2.216 | .3225 | .2108 | 1.529 |
| JPL-2 | .7943 | 37360. | 272.19 | 9.060 | .5901 | 2.553 | .3610 | .2383 | 1.514 |
| JPL-3 | .7940 | 40190. | 270.59 | 8.994 | .5552 | 2.749 | .3812 | .2524 | 1.509 |
| JPL-4 | .7921 | 41090. | 271.52 | 9.002 | .5579 | 2.869 | .3979 | .2637 | 1.508 |
| JPL-5 | .7919 | 42600. | 271.55 | 8.944 | .5867 | 2.965 | .4155 | .2747 | 1.512 |

Table A1. (Cont.)

| STATION | ME | RE-THETA | UE (M/SEC) | UTAU (M/SEC) | PI | DELTA (CM) | DELTA-STAR (CM) | THETA (CM) | H |
|---------|--------|----------|---------------|-----------------|-------|---------------|--------------------|---------------|-------|
| JPL-1 | .9664 | 18650. | 313.76 | 10.997 | .7057 | 2.104 | .3487 | .2079 | 1.677 |
| JPL-2 | .9669 | 20890. | 314.63 | 10.916 | .6968 | 2.430 | .3983 | .2385 | 1.670 |
| JPL-3 | .9719 | 22720. | 314.66 | 11.007 | .6076 | 2.609 | .4084 | .2466 | 1.656 |
| JPL-4 | .9672 | 22840. | 315.09 | 10.974 | .6222 | 2.696 | .4228 | .2556 | 1.653 |
| JPL-5 | .9651 | 23850. | 314.15 | 10.902 | .6222 | 2.816 | .4407 | .2665 | 1.653 |
| JPL-1 | .9648 | 32330. | 321.78 | 10.901 | .6331 | 2.015 | .3113 | .1898 | 1.639 |
| JPL-2 | .9626 | 36250. | 322.24 | 10.829 | .6210 | 2.345 | .3559 | .2175 | 1.636 |
| JPL-3 | .9613 | 38500. | 321.05 | 10.822 | .5501 | 2.551 | .3667 | .2273 | 1.613 |
| JPL-4 | .9637 | 39900. | 322.66 | 10.804 | .5887 | 2.628 | .3894 | .2386 | 1.631 |
| JPL-5 | .9606 | 41550. | 322.04 | 10.738 | .5925 | 2.750 | .4076 | .2505 | 1.627 |
| JPL-2 | 1.3141 | 19780. | 401.96 | 14.526 | .6503 | 2.325 | .4186 | .2121 | 1.973 |
| JPL-3 | 1.3215 | 21880. | 402.38 | 14.498 | .6356 | 2.504 | .4474 | .2262 | 1.978 |
| JPL-4 | 1.3197 | 21900. | 401.99 | 14.478 | .6090 | 2.619 | .4601 | .2335 | 1.970 |
| JPL-5 | 1.3151 | 24190. | 396.85 | 14.197 | .6205 | 2.713 | .4777 | .2433 | 1.963 |
| JPL-2 | 1.3082 | 37230. | 408.33 | 14.154 | .6272 | 2.214 | .3783 | .1945 | 1.944 |
| JPL-3 | 1.3173 | 37550. | 409.20 | 14.260 | .5508 | 2.402 | .3969 | .2047 | 1.938 |
| JPL-4 | 1.3125 | 37900. | 408.71 | 14.239 | .5314 | 2.486 | .4061 | .2104 | 1.929 |
| JPL-5 | 1.3130 | 40210. | 406.36 | 14.052 | .5630 | 2.566 | .4242 | .2189 | 1.937 |
| JPL-2 | 2.1722 | 23070. | 549.35 | 21.418 | .6109 | 3.170 | .7410 | .2368 | 3.129 |
| JPL-3 | 2.1666 | 23520. | 550.76 | 21.404 | .6175 | 3.253 | .7595 | .2435 | 3.119 |
| JPL-4 | 2.1642 | 24690. | 549.37 | 21.234 | .6194 | 3.419 | .7967 | .2555 | 3.117 |
| JPL-5 | 2.1722 | 25060. | 552.35 | 21.325 | .6275 | 3.489 | .8137 | .2601 | 3.127 |
| JPL-2 | 2.1812 | 38050. | 564.19 | 21.210 | .5705 | 3.080 | .6873 | .2208 | 3.112 |
| JPL-3 | 2.1737 | 40570. | 560.66 | 21.016 | .5692 | 3.125 | .6942 | .2240 | 3.098 |
| JPL-4 | 2.1820 | 41600. | 561.76 | 21.077 | .5463 | 3.262 | .7178 | .2312 | 3.104 |
| JPL-5 | 2.1797 | 43060. | 562.73 | 20.963 | .5751 | 3.381 | .7507 | .2415 | 3.107 |

Table A2.

PRESTON TUBE DATA SUMMARY

| STATION | ME | RE-THEFA | D | CP | CF(H/K) | CF(R/H) | CF(RAL) |
|---------|-------|----------|------|---------|---------|---------|---------|
| CIT-1 | .1050 | 1029. | .210 | .560257 | .004057 | .003911 | |
| CIT-2 | .1050 | 1875. | .210 | .464882 | .003458 | .003331 | |
| CIT-3 | .1050 | 2798. | .210 | .407584 | .003087 | .002982 | |
| CIT-4 | .1058 | 5932. | .210 | .367129 | .002630 | .002715 | |
| CIT-5 | .1072 | 6209. | .210 | .353816 | .002553 | .002637 | |
| CIT-6 | .1031 | 6504. | .210 | .377610 | .002683 | .002772 | |
| CIT-7 | .1036 | 7270. | .210 | .382737 | .002736 | .002825 | |
| CIT-8 | .1052 | 7475. | .210 | .362560 | .002611 | .002700 | |
| CIT-9 | .1070 | 8068. | .210 | .345333 | .002493 | .002575 | |
| JPL-2 | .5927 | 20180. | .082 | .316354 | .002173 | .002187 | |
| JPL-2 | .5927 | 20180. | .162 | .379467 | .002167 | .002157 | |
| JPL-2 | .5927 | 20180. | .317 | .458710 | .002179 | .002165 | |
| JPL-4 | .6018 | 22400. | .082 | .303770 | .002091 | .002098 | |
| JPL-4 | .6018 | 22400. | .162 | .373014 | .002128 | .002115 | .002165 |
| JPL-2 | .5964 | 34330. | .082 | .335341 | .001982 | .001992 | |
| JPL-2 | .5964 | 34330. | .162 | .408831 | .002004 | .002004 | |
| JPL-2 | .5964 | 34330. | .162 | .421421 | .002056 | .002053 | |
| JPL-2 | .5964 | 34330. | .162 | .418002 | .002042 | .002040 | |
| JPL-2 | .5964 | 34330. | .317 | .484368 | .001979 | .001988 | |
| JPL-4 | .5931 | 36470. | .082 | .332704 | .001972 | .001979 | |
| JPL-4 | .5931 | 36470. | .162 | .405812 | .001995 | .001992 | .001994 |
| JPL-2 | .7882 | 21850. | .082 | .328045 | .002137 | .002105 | |
| JPL-2 | .7882 | 21850. | .162 | .398651 | .002148 | .002093 | |
| JPL-2 | .7882 | 21850. | .317 | .477383 | .002133 | .002072 | |
| JPL-4 | .8016 | 23710. | .082 | .315878 | .002063 | .002036 | |
| JPL-4 | .8016 | 23710. | .162 | .383229 | .002070 | .002019 | .002086 |

Table A2. (Cont.)

| STATION | MF | RF-THETA | D | CP | CF (H/K) | CF (R/H) | CF (BAL) |
|---------|--------|----------|------|---------|----------|----------|----------|
| JPL-2 | .7943 | 37360. | .082 | .348449 | .001932 | .001902 | |
| JPL-2 | .7943 | 37360. | .162 | .425013 | .001946 | .001910 | |
| JPL-2 | .7943 | 37360. | .162 | .439066 | .002000 | .001957 | |
| JPL-2 | .7943 | 37360. | .162 | .435555 | .001986 | .001945 | |
| JPL-2 | .7943 | 37360. | .317 | .528374 | .001992 | .001961 | |
| JPL-4 | .7921 | 41090. | .082 | .344329 | .001916 | .001884 | |
| JPL-4 | .7921 | 41090. | .162 | .418386 | .001924 | .001884 | .001942 |
| JPL-2 | .9669 | 20890. | .082 | .332683 | .002108 | .002037 | |
| JPL-2 | .9669 | 20890. | .162 | .404747 | .002112 | .002012 | |
| JPL-2 | .9669 | 20890. | .317 | .497931 | .002135 | .002024 | |
| JPL-4 | .9672 | 22840. | .082 | .330050 | .002084 | .002027 | |
| JPL-4 | .9672 | 22840. | .162 | .398956 | .002078 | .001990 | .002057 |
| JPL-2 | .9626 | 36250. | .082 | .350932 | .001896 | .001837 | |
| JPL-2 | .9626 | 36250. | .162 | .430063 | .001910 | .001841 | |
| JPL-2 | .9626 | 36250. | .162 | .450468 | .001983 | .001905 | |
| JPL-2 | .9626 | 36250. | .162 | .447305 | .001972 | .001894 | |
| JPL-2 | .9626 | 36250. | .317 | .520053 | .001903 | .001841 | |
| JPL-4 | .9637 | 39900. | .082 | .344768 | .001867 | .001812 | |
| JPL-4 | .9637 | 39900. | .162 | .420335 | .001873 | .001808 | .001947 |
| JPL-2 | 1.3141 | 19780. | .082 | .304857 | .001895 | .001812 | |
| JPL-2 | 1.3141 | 19780. | .162 | .379365 | .001920 | .001801 | |
| JPL-2 | 1.3141 | 19780. | .162 | .379138 | .001910 | .001801 | |
| JPL-2 | 1.3141 | 19790. | .162 | .368889 | .001878 | .001763 | |
| JPL-2 | 1.3141 | 19780. | .317 | .465244 | .001920 | .001790 | |
| JPL-4 | 1.3197 | 21900. | .082 | .309447 | .001915 | .001827 | |
| JPL-4 | 1.3197 | 21900. | .162 | .378095 | .001911 | .001789 | .001867 |

Table A2. (Cont.)

| STATION | ME | RF-THETA | D | CP | CF(H/K) | CF(R/U) | CF(RAL) |
|---------|--------|----------|------|---------|---------|---------|---------|
| JPL-2 | 1.3082 | 37230. | .082 | .346958 | .001775 | .001707 | |
| JPL-2 | 1.3082 | 37230. | .162 | .431352 | .001793 | .001710 | |
| JPL-2 | 1.3082 | 37230. | .162 | .426238 | .001776 | .001696 | |
| JPL-2 | 1.3082 | 37230. | .162 | .423388 | .001767 | .001689 | |
| JPL-2 | 1.3082 | 37230. | .317 | .526062 | .001782 | .001707 | |
| JPL-4 | 1.3125 | 37900. | .082 | .347334 | .001801 | .001703 | |
| JPL-4 | 1.3125 | 37900. | .162 | .427147 | .001804 | .001692 | .001788 |
| JPL-2 | 2.1722 | 23070. | .082 | .268505 | .001628 | .001552 | |
| JPL-2 | 2.1722 | 23070. | .162 | .322846 | .001721 | .001457 | |
| JPL-2 | 2.1722 | 23070. | .162 | .324205 | .001716 | .001463 | |
| JPL-2 | 2.1722 | 23070. | .162 | .317184 | .001742 | .001442 | |
| JPL-2 | 2.1722 | 23070. | .317 | .426345 | .001896 | .001479 | |
| JPL-4 | 2.1642 | 24690. | .082 | .265795 | .001620 | .001540 | |
| JPL-4 | 2.1642 | 24690. | .162 | .321750 | .001747 | .001455 | .001532 |
| JPL-2 | 2.1812 | 38050. | .082 | .296896 | .001570 | .001414 | |
| JPL-2 | 2.1812 | 38050. | .162 | .368118 | .001587 | .001376 | |
| JPL-2 | 2.1812 | 38050. | .162 | .370214 | .001581 | .001378 | |
| JPL-2 | 2.1812 | 38050. | .162 | .361398 | .001607 | .001358 | |
| JPL-2 | 2.1812 | 38050. | .317 | .482945 | .001723 | .001402 | |
| JPL-4 | 2.1820 | 41600. | .082 | .293865 | .001564 | .001399 | |
| JPL-4 | 2.1820 | 41600. | .162 | .363573 | .001583 | .001358 | .001445 |

Table A3.

STREAM-WISE VARIATION OF FLOW PROPERTIES

| ME | RE-THETA | RFTA | DTDX | MOMR |
|--------|----------|-----------|---------|-------|
| .1031 | 6604. | .883E-05 | .001384 | |
| .6018 | 22400. | .651E-05 | .001048 | .968 |
| .5931 | 36470. | .650E-05 | .000996 | .999 |
| .8016 | 23710. | .144E-05 | .001021 | .979 |
| .7921 | 41090. | .366E-05 | .000971 | 1.000 |
| .9672 | 22840. | -.115E-04 | .001027 | .998 |
| .9637 | 39900. | .871E-06 | .001007 | 1.035 |
| 1.3197 | 21900. | .606E-05 | .000927 | .993 |
| 1.3125 | 37900. | .666E-05 | .000875 | .979 |
| 2.1642 | 24690. | .228E-06 | .000766 | 1.000 |
| 2.1820 | 41600. | -.252E-05 | .000722 | .999 |

TABLE A 4. DATA SUMMARY
PROFILE - CIT-4 - - - PITNT PRESSURE DATA

EDGE MACH NO.= .1058 TOTAL PRESSURE= .1006E+06 N/M**2
X= 152.40 CM TOTAL TEMPERATURE= 307.05 DEG-K

UE= 37.25 M/SFC DELTA STAR= .3572 CM THETA= .2683 CM M= 1.331
RE-DELTA-STAR= 7899. RE-THETA= 5932. NUWALL= .1685 CM**2/SFC

LEAST SQUARE FIT PARAMETERS
UTAU= 1.3923 M/SEC CF= .002787 PI= .4642 DELTA= 2.4020 CM
CHISQR= .4833E-04 YMAX= 2.175 CM YMIN= .091 CM

| Y (CM) | Y/THETA | Y-PLUS | M/ME | RHO/RHNE | U/UE | U-PLUS | TAU/TAU-MAX | V/U |
|--------|---------|--------|--------|----------|--------|--------|-------------|----------|
| 0.000 | 0.000 | 0. | 0.0000 | 1.0000 | 0.0000 | 0.00 | 1.0000 | 0.000000 |
| .031 | .118 | 26. | .4961 | 1.0000 | .4961 | 13.27 | 1.0000 | 0.000000 |
| .035 | .133 | 29. | .5080 | 1.0000 | .5080 | 13.59 | .9996 | .000002 |
| .040 | .150 | 33. | .5212 | 1.0000 | .5212 | 13.94 | .9992 | .000004 |
| .047 | .177 | 39. | .5403 | 1.0000 | .5403 | 14.46 | .9985 | .000008 |
| .055 | .207 | 45. | .5543 | 1.0000 | .5543 | 14.83 | .9977 | .000013 |
| .071 | .266 | 58. | .5738 | 1.0000 | .5738 | 15.35 | .9961 | .000021 |
| .091 | .330 | 75. | .5927 | 1.0000 | .5927 | 15.86 | .9938 | .000030 |
| .111 | .414 | 91. | .6055 | 1.0000 | .6055 | 16.20 | .9914 | .000040 |
| .143 | .532 | 118. | .6248 | 1.0000 | .6248 | 16.72 | .9873 | .000056 |
| .176 | .656 | 145. | .6423 | 1.0000 | .6423 | 17.18 | .9827 | .000073 |
| .187 | .698 | 154. | .6669 | 1.0000 | .6669 | 17.84 | .9810 | .000078 |
| .206 | .769 | 170. | .6566 | 1.0000 | .6566 | 17.57 | .9781 | .000088 |
| .271 | 1.012 | 224. | .6782 | 1.0000 | .6782 | 18.15 | .9674 | .000121 |
| .350 | 1.307 | 289. | .7028 | 1.0000 | .7028 | 18.80 | .9526 | .000164 |
| .430 | 1.603 | 355. | .7243 | 1.0000 | .7243 | 19.38 | .9357 | .000209 |
| .587 | 2.189 | 485. | .7619 | 1.0000 | .7619 | 20.39 | .8957 | .000309 |
| .749 | 2.792 | 619. | .7946 | 1.0000 | .7946 | 21.26 | .8446 | .000425 |
| .906 | 3.378 | 749. | .8230 | 1.0000 | .8230 | 22.02 | .7844 | .000552 |
| 1.065 | 3.970 | 880. | .8544 | 1.0000 | .8544 | 22.86 | .7130 | .000693 |
| 1.222 | 4.556 | 1010. | .8760 | 1.0000 | .8760 | 23.44 | .6323 | .000843 |
| 1.540 | 5.739 | 1272. | .9231 | 1.0000 | .9231 | 24.70 | .4481 | .001159 |
| 1.859 | 6.928 | 1536. | .9654 | 1.0000 | .9654 | 25.83 | .2533 | .001465 |
| 2.016 | 7.514 | 1646. | .9794 | 1.0000 | .9794 | 26.20 | .1627 | .001601 |
| 2.175 | 8.106 | 1747. | .9897 | 1.0000 | .9897 | 26.48 | .0810 | .001719 |
| 2.333 | 8.698 | 1928. | .9965 | 1.0000 | .9965 | 26.66 | .0142 | .001814 |
| 2.419 | 9.017 | 1999. | .9982 | 1.0000 | .9982 | 26.71 | 0.0000 | .001834 |
| 2.490 | 9.283 | 2058. | .9982 | 1.0000 | .9982 | 26.71 | 0.0000 | .001834 |
| 2.573 | 9.591 | 2126. | .9991 | 1.0000 | .9991 | 26.73 | 0.0000 | .001834 |
| 2.649 | 9.875 | 2189. | .9991 | 1.0000 | .9991 | 26.73 | 0.0000 | .001834 |
| 2.732 | 10.182 | 2257. | .9991 | 1.0000 | .9991 | 26.73 | 0.0000 | .001834 |
| 2.811 | 10.479 | 2323. | 1.0000 | 1.0000 | 1.0000 | 26.76 | 0.0000 | .001834 |
| 2.890 | 10.774 | 2388. | 1.0000 | 1.0000 | 1.0000 | 26.76 | 0.0000 | .001834 |

TABLE A 4. (CONT.)
 PROFILE - CIT-5 - - - PITOT PRESSURE DATA

EDGE MACH NO.= .1072 TOTAL PRESSURE= .1007E+06 N/M**2
 X= 167.64 CM TOTAL TEMPERATURE= 312.75 DEG-K

UE= 38.01 M/SEC DELTA STAR= .3759 CM THETA= .2843 CM H= 1.322
 RE-DELTA-STAR= 8210. RE-THETA= 6209. NUWALL= .1740 CM**2/SEC

LEAST SQUARE FIT PARAMETERS
 UTAU= 1.4204 M/SEC CF= .002786 P1= .4346 DELTA= 2.5844 CM
 CHISQR= .9792E-05 YMAX= 2.383 CM YMIN= .097 CM

| Y (CM) | Y/THETA | Y-PLUS | M/ME | RHO/RHOF | U/UE | II-PLUS | TAU/TAU-MAX | V/U |
|--------|---------|--------|--------|----------|--------|---------|-------------|----------|
| 0.000 | 0.000 | 0. | 0.0000 | 1.0000 | 0.0000 | 0.00 | 1.0000 | 0.000000 |
| .031 | .111 | 75. | .4877 | 1.0000 | .4877 | 13.05 | 1.0000 | 0.000000 |
| .032 | .114 | 26. | .4962 | 1.0000 | .4962 | 13.28 | .9999 | 0.000000 |
| .035 | .125 | 29. | .5078 | 1.0000 | .5078 | 13.59 | .9996 | .000002 |
| .040 | .142 | 32. | .5255 | 1.0000 | .5255 | 14.06 | .9992 | .000004 |
| .043 | .152 | 35. | .5319 | 1.0000 | .5319 | 14.23 | .9990 | .000006 |
| .051 | .181 | 42. | .5487 | 1.0000 | .5487 | 14.68 | .9983 | .000010 |
| .057 | .203 | 47. | .5562 | 1.0000 | .5562 | 14.88 | .9977 | .000013 |
| .067 | .234 | 54. | .5695 | 1.0000 | .5695 | 15.24 | .9968 | .000017 |
| .081 | .286 | 66. | .5840 | 1.0000 | .5840 | 15.63 | .9954 | .000023 |
| .097 | .343 | 79. | .5925 | 1.0000 | .5925 | 15.85 | .9937 | .000031 |
| .114 | .401 | 93. | .6036 | 1.0000 | .6036 | 16.15 | .9919 | .000038 |
| .129 | .454 | 105. | .6131 | 1.0000 | .6131 | 16.41 | .9901 | .000045 |
| .145 | .510 | 118. | .6279 | 1.0000 | .6279 | 16.80 | .9882 | .000052 |
| .161 | .565 | 131. | .6359 | 1.0000 | .6359 | 17.01 | .9862 | .000059 |
| .192 | .678 | 157. | .6487 | 1.0000 | .6487 | 17.36 | .9820 | .000074 |
| .226 | .795 | 184. | .6627 | 1.0000 | .6627 | 17.73 | .9773 | .000089 |
| .256 | .901 | 209. | .6752 | 1.0000 | .6752 | 18.07 | .9728 | .000103 |
| .288 | 1.015 | 235. | .6837 | 1.0000 | .6837 | 18.30 | .9677 | .000119 |
| .319 | 1.124 | 261. | .6982 | 1.0000 | .6982 | 18.68 | .9626 | .000134 |
| .399 | 1.403 | 325. | .7193 | 1.0000 | .7193 | 19.25 | .9484 | .000173 |
| .478 | 1.683 | 390. | .7376 | 1.0000 | .7376 | 19.74 | .9324 | .000215 |
| .637 | 2.241 | 520. | .7674 | 1.0000 | .7674 | 20.54 | .8949 | .000306 |
| .796 | 2.800 | 649. | .8003 | 1.0000 | .8003 | 21.42 | .8493 | .000409 |
| .954 | 3.358 | 779. | .8299 | 1.0000 | .8299 | 22.21 | .7949 | .000523 |
| 1.113 | 3.916 | 909. | .8556 | 1.0000 | .8556 | 22.89 | .7317 | .000648 |
| 1.273 | 4.480 | 1039. | .8729 | 1.0000 | .8729 | 23.36 | .6594 | .000783 |
| 1.589 | 5.592 | 1297. | .9165 | 1.0000 | .9165 | 24.53 | .4973 | .001064 |
| 1.909 | 6.716 | 1558. | .9557 | 1.0000 | .9557 | 25.57 | .3209 | .001346 |
| 2.068 | 7.275 | 1688. | .9695 | 1.0000 | .9695 | 25.94 | .2348 | .001476 |
| 2.224 | 7.825 | 1816. | .9831 | 1.0000 | .9831 | 26.31 | .1558 | .001593 |
| 2.383 | 8.383 | 1945. | .9891 | 1.0000 | .9891 | 26.47 | .0853 | .001694 |
| 2.545 | 8.953 | 2077. | .9958 | 1.0000 | .9958 | 26.65 | .0266 | .001777 |
| 2.704 | 9.511 | 2207. | .9983 | 1.0000 | .9983 | 26.71 | 0.0000 | .001815 |
| 2.862 | 10.069 | 2337. | 1.0000 | 1.0000 | 1.0000 | 26.76 | 0.0000 | .001815 |
| 2.942 | 10.349 | 2407. | 1.0000 | 1.0000 | 1.0000 | 26.76 | 0.0000 | .001815 |

TABLE A 4. (CONT.)
PROFILE - CIT-6 - - - PITOT PRESSURE DATA

EDGE MACH NO.= .1031 TOTAL PRESSURE= .1075E+06 N/M**2
X= 182.88 CM TOTAL TEMPRATURF= 303.75 DEG-K

UE= 37.34 M/SEC DELTA STAR= .3860 CM THETA= .2924 CM H 1.320
RE-DELTA-STAR= 8718. RE-THETA= 6604. NUWALL= .1653 CM**2/.cC

LEAST SQUARE FIT PARAMETERS
UTAU= 1.3875 M/SEC CF= .002756 PI= .6374 DELTA= 2.6563 CM
CHISQR= .3086E-04 YMAX= 2.257 CM YMIN= .091 CM

| Y (CM) | Y/THETA | Y-PLUS | M/ME | RHO/RH0E | U/UE | U-PLUS | TAU/TAU-MAX | V/U |
|--------|---------|--------|--------|----------|--------|--------|-------------|----------|
| 0.000 | 0.000 | 0. | 0.0000 | 1.0000 | 0.0000 | 0.00 | 1.0000 | 0.000000 |
| .031 | .108 | 26. | .4991 | 1.0000 | .4991 | 13.43 | 1.0000 | 0.000000 |
| .034 | .119 | 29. | .5156 | 1.0000 | .5156 | 13.87 | .9997 | .000001 |
| .038 | .130 | 31. | .5252 | 1.0000 | .5252 | 14.13 | .9994 | .000003 |
| .041 | .140 | 34. | .5331 | 1.0000 | .5331 | 14.34 | .9992 | .000004 |
| .045 | .154 | 37. | .5408 | 1.0000 | .5408 | 14.55 | .9988 | .000006 |
| .048 | .165 | 40. | .5486 | 1.0000 | .5486 | 14.76 | .9986 | .000008 |
| .052 | .178 | 43. | .5531 | 1.0000 | .5531 | 14.88 | .9982 | .000010 |
| .058 | .200 | 49. | .5591 | 1.0000 | .5591 | 15.04 | .9976 | .000013 |
| .065 | .222 | 54. | .5651 | 1.0000 | .5651 | 15.20 | .9971 | .000015 |
| .070 | .241 | 59. | .5725 | 1.0000 | .5725 | 15.40 | .9965 | .000018 |
| .074 | .254 | 62. | .5782 | 1.0000 | .5782 | 15.56 | .9961 | .000020 |
| .091 | .314 | 77. | .5911 | 1.0000 | .5911 | 15.91 | .9944 | .000027 |
| .106 | .363 | 89. | .6009 | 1.0000 | .6009 | 16.17 | .9928 | .000034 |
| .122 | .417 | 102. | .6133 | 1.0000 | .6133 | 16.50 | .9911 | .000041 |
| .138 | .474 | 116. | .6227 | 1.0000 | .6227 | 16.76 | .9891 | .000048 |
| .154 | .529 | 129. | .6295 | 1.0000 | .6295 | 16.94 | .9872 | .000055 |
| .170 | .582 | 143. | .6361 | 1.0000 | .6361 | 17.12 | .9852 | .000062 |
| .195 | .669 | 164. | .6477 | 1.0000 | .6477 | 17.43 | .9818 | .000073 |
| .241 | .825 | 202. | .6668 | 1.0000 | .6668 | 17.94 | .9754 | .000094 |
| .288 | .987 | 242. | .6805 | 1.0000 | .6805 | 18.31 | .9682 | .000116 |
| .352 | 1.204 | 295. | .6987 | 1.0000 | .6987 | 18.80 | .9577 | .000146 |
| .431 | 1.476 | 362. | .7199 | 1.0000 | .7199 | 19.37 | .9432 | .000185 |
| .511 | 1.747 | 428. | .7382 | 1.0000 | .7382 | 19.86 | .9270 | .000226 |
| .649 | 2.290 | 562. | .7748 | 1.0000 | .7748 | 20.85 | .8890 | .000317 |
| .828 | 2.833 | 695. | .8075 | 1.0000 | .8075 | 21.73 | .8432 | .000418 |
| .987 | 3.376 | 828. | .8320 | 1.0000 | .8320 | 22.39 | .7888 | .000530 |
| 1.304 | 4.462 | 1095. | .8741 | 1.0000 | .8741 | 23.52 | .6553 | .000783 |
| 1.622 | 5.548 | 1361. | .9207 | 1.0000 | .9207 | 24.77 | .4945 | .001059 |
| 1.939 | 6.634 | 1628. | .9546 | 1.0000 | .9546 | 25.69 | .3209 | .001334 |
| 2.257 | 7.719 | 1894. | .9762 | 1.0000 | .9762 | 26.27 | .1562 | .001579 |
| 2.574 | 8.805 | 2161. | .9907 | 1.0000 | .9907 | 26.66 | .0265 | .001763 |
| 2.733 | 9.348 | 2294. | .9974 | 1.0000 | .9974 | 26.84 | 0.0000 | .001800 |
| 2.892 | 9.891 | 2427. | .9983 | 1.0000 | .9983 | 26.86 | 0.0000 | .001800 |
| 2.971 | 10.163 | 2494. | 1.0000 | 1.0000 | 1.0000 | 26.91 | 0.0000 | .001800 |

TABLE A 4. (CONT.)
PROFILE - CIT-7 - - - PITOT PRESSURE DATA

ENGE MACH NO.= .1036
X= 198.12 CM

TOTAL PRESSURE= .9879F+05 N/M**2
TOTAL TEMPERATURE= 372.75 DEG-K

UE= 35.91 M/SFC
RE-DELTA-STAR= 9621.

DELTA STAR= .4404 CM
RE-THETA= 7270.

THETA= .3328 CM
RIJWALL= .1643 CM**2/SEC

H= 1.323

LEAST SQUARE FIT PARAMETERS

UTAU= 1.3180 M/SFC
CHISQR= .2505E-04

CF= .002689
YMAX= 2.851 CM

PI= .6643
YMIN= .087 CM

DELTA= 3.0186 CM

| Y (CM) | Y/THETA | Y-PLUS | M/ME | RHO/RHOF | U/UF | W-PLUS | TAU/TAU-MAX | V/U |
|--------|---------|--------|--------|----------|--------|--------|-------------|----------|
| 0.000 | 0.000 | 0. | 0.0000 | 1.0000 | 0.0000 | 0.00 | 1.0000 | 0.000000 |
| .031 | .095 | 25. | .5026 | 1.0000 | .5076 | 13.69 | 1.0000 | 0.000000 |
| .031 | .095 | 25. | .5063 | 1.0000 | .5063 | 13.79 | .9999 | 0.000000 |
| .040 | .120 | 32. | .5237 | 1.0000 | .5237 | 14.26 | .9994 | .000003 |
| .047 | .144 | 38. | .5406 | 1.0000 | .5406 | 14.73 | .9989 | .000006 |
| .057 | .171 | 45. | .5474 | 1.0000 | .5474 | 14.91 | .9982 | .000010 |
| .071 | .215 | 57. | .5619 | 1.0000 | .5619 | 15.31 | .9971 | .000015 |
| .087 | .263 | 70. | .5794 | 1.0000 | .5794 | 15.78 | .9958 | .000021 |
| .103 | .311 | 83. | .5886 | 1.0000 | .5886 | 16.03 | .9944 | .000027 |
| .120 | .362 | 96. | .6008 | 1.0000 | .6008 | 16.36 | .9929 | .000033 |
| .151 | .453 | 121. | .6171 | 1.0000 | .6171 | 16.81 | .9900 | .000044 |
| .182 | .549 | 146. | .6286 | 1.0000 | .6286 | 17.12 | .9867 | .000056 |
| .214 | .644 | 172. | .6456 | 1.0000 | .6456 | 17.59 | .9832 | .000067 |
| .247 | .743 | 198. | .6581 | 1.0000 | .6581 | 17.93 | .9794 | .000079 |
| .278 | .835 | 223. | .6663 | 1.0000 | .6663 | 18.15 | .9757 | .000091 |
| .309 | .930 | 248. | .6744 | 1.0000 | .6744 | 18.37 | .9716 | .000103 |
| .389 | 1.169 | 312. | .6993 | 1.0000 | .6993 | 19.05 | .9607 | .000134 |
| .468 | 1.407 | 375. | .7171 | 1.0000 | .7171 | 19.53 | .9486 | .000166 |
| .628 | 1.988 | 504. | .7480 | 1.0000 | .7480 | 20.37 | .9202 | .000236 |
| .786 | 2.362 | 630. | .7741 | 1.0000 | .7741 | 21.09 | .8868 | .000313 |
| .944 | 2.839 | 757. | .7993 | 1.0000 | .7993 | 21.77 | .8470 | .000399 |
| 1.103 | 3.316 | 885. | .8249 | 1.0000 | .8249 | 22.47 | .8007 | .000493 |
| 1.263 | 3.796 | 1013. | .8486 | 1.0000 | .8486 | 23.12 | .7473 | .000595 |
| 1.581 | 4.750 | 1268. | .8881 | 1.0000 | .8881 | 24.19 | .6231 | .000817 |
| 1.848 | 5.704 | 1523. | .9279 | 1.0000 | .9279 | 25.28 | .4800 | .001053 |
| 2.216 | 6.658 | 1777. | .9519 | 1.0000 | .9519 | 25.93 | .3292 | .001285 |
| 2.533 | 7.612 | 2037. | .9753 | 1.0000 | .9753 | 26.57 | .1861 | .001493 |
| 2.548 | 7.658 | 2044. | .9780 | 1.0000 | .9780 | 26.64 | .1796 | .001502 |
| 2.564 | 7.704 | 2056. | .9798 | 1.0000 | .9798 | 26.69 | .1732 | .001511 |
| 2.580 | 7.752 | 2069. | .9817 | 1.0000 | .9817 | 26.74 | .1666 | .001520 |
| 2.660 | 7.994 | 2134. | .9845 | 1.0000 | .9845 | 26.82 | .1341 | .001566 |
| 2.851 | 8.567 | 2287. | .9918 | 1.0000 | .9918 | 27.02 | .0666 | .001659 |
| 3.008 | 9.040 | 2413. | .9963 | 1.0000 | .9963 | 27.14 | .0222 | .001719 |
| 3.168 | 9.521 | 2541. | .9981 | 1.0000 | .9981 | 27.19 | 0.0000 | .001749 |
| 3.486 | 10.475 | 2796. | 1.0000 | 1.0000 | 1.0000 | 27.24 | 0.0000 | .001749 |
| 3.643 | 10.948 | 2922. | 1.0000 | 1.0000 | 1.0000 | 27.24 | 0.0000 | .001749 |

TABLE A 4. (CONT.)
PROFILE - CIT-8 - - - PITOT PRESSURE DATA

EDGE MACH NO.= .1052 TOTAL PRESSURE= .1013E+06 N/M**2
X= 213.36 CM TOTAL TEMPERATURE= 310.85 DEG-K

UE= 37.42 M/SEC DELTA STAR= .4545 CM THETA= .3439 CM H= 1.321
RE-DELTA-STAR= 9878. RE-THETA= 7475. NUWALL= .1722 CM**2/SEC

LEAST SQUARE FIT PARAMETERS
UTAU= 1.3737 M/SFC CF= .002689 PI= .6453 DELTA= 3.1494 CM
CHISQR= .1897E-04 YMAX= 2.946 CM YMIN= .097 CM

| Y (CM) | Y/THETA | Y-PLUS | M/ME | RHO/RHOF | U/UE | U-PLUS | TAU/TAU-MAX | V/U |
|--------|---------|--------|--------|----------|--------|--------|-------------|----------|
| 0.000 | 0.000 | 0. | 0.0000 | 1.0000 | 0.0000 | 0.00 | 1.0000 | 0.000000 |
| .031 | .092 | 25. | .4838 | 1.0000 | .4938 | 13.18 | 1.0000 | 0.000000 |
| .038 | .110 | 30. | .4855 | 1.0000 | .4855 | 13.22 | .9995 | .000002 |
| .045 | .133 | 36. | .4991 | 1.0000 | .4991 | 13.59 | .9990 | .000005 |
| .052 | .152 | 41. | .5236 | 1.0000 | .5236 | 14.26 | .9986 | .000008 |
| .060 | .175 | 48. | .5409 | 1.0000 | .5409 | 14.73 | .9980 | .000011 |
| .068 | .198 | 54. | .5516 | 1.0000 | .5516 | 15.02 | .9974 | .000014 |
| .076 | .223 | 61. | .5606 | 1.0000 | .5606 | 15.27 | .9967 | .000017 |
| .088 | .258 | 70. | .5724 | 1.0000 | .5724 | 15.59 | .9958 | .000021 |
| .097 | .283 | 77. | .5825 | 1.0000 | .5825 | 15.87 | .9950 | .000024 |
| .129 | .375 | 103. | .5996 | 1.0000 | .5996 | 16.33 | .9922 | .000035 |
| .158 | .461 | 126. | .6160 | 1.0000 | .6160 | 16.78 | .9894 | .000046 |
| .196 | .572 | 157. | .6361 | 1.0000 | .6361 | 17.37 | .9855 | .000059 |
| .239 | .694 | 190. | .6668 | 1.0000 | .6668 | 18.16 | .9809 | .000075 |
| .349 | 1.015 | 278. | .6879 | 1.0000 | .6879 | 18.74 | .9672 | .000115 |
| .428 | 1.744 | 347. | .7059 | 1.0000 | .7059 | 19.23 | .9561 | .000146 |
| .508 | 1.476 | 405. | .7234 | 1.0000 | .7234 | 19.70 | .9439 | .000178 |
| .670 | 1.948 | 534. | .7551 | 1.0000 | .7551 | 20.57 | .9152 | .000248 |
| .825 | 2.399 | 658. | .7801 | 1.0000 | .7801 | 21.25 | .8825 | .000322 |
| .984 | 2.861 | 785. | .8043 | 1.0000 | .8043 | 21.91 | .8436 | .000405 |
| 1.144 | 3.327 | 913. | .8290 | 1.0000 | .8290 | 22.58 | .7982 | .000497 |
| 1.305 | 3.794 | 1041. | .8459 | 1.0000 | .8459 | 23.04 | .7465 | .000596 |
| 1.464 | 4.257 | 1168. | .8702 | 1.0000 | .8702 | 23.70 | .6892 | .000701 |
| 1.619 | 4.707 | 1291. | .8855 | 1.0000 | .8855 | 24.12 | .6284 | .000808 |
| 1.778 | 5.169 | 1418. | .9023 | 1.0000 | .9023 | 24.58 | .5613 | .000921 |
| 1.940 | 5.640 | 1547. | .9216 | 1.0000 | .9216 | 25.10 | .4891 | .001039 |
| 2.257 | 6.563 | 1800. | .9493 | 1.0000 | .9493 | 25.86 | .3427 | .001265 |
| 2.575 | 7.486 | 2054. | .9745 | 1.0000 | .9745 | 26.54 | .2013 | .001472 |
| 2.946 | 8.546 | 2350. | .9890 | 1.0000 | .9890 | 26.94 | .0628 | .001667 |
| 3.052 | 8.875 | 2435. | .9949 | 1.0000 | .9949 | 27.10 | .0308 | .001710 |
| 3.135 | 9.115 | 2501. | .9965 | 1.0000 | .9965 | 27.14 | .0092 | .001740 |
| 3.206 | 9.323 | 2558. | .9982 | 1.0000 | .9982 | 27.19 | 0.0000 | .001752 |
| 3.286 | 9.554 | 2621. | 1.0000 | 1.0000 | 1.0000 | 27.24 | 0.0000 | .001752 |
| 3.365 | 9.784 | 2684. | 1.0000 | 1.0000 | 1.0000 | 27.24 | 0.0000 | .001752 |

TABLE A 4. (CONT.)
PROFILE - CIT-9 - - - PITOT PRESSURE DATA

FDGF MACH NO.= .1070
X= 228.60 CM

TOTAL PRESSURE= .1001E+06 N/M**2
TOTAL TEMPERATURE= 310.05 DEG-K

UE= 37.79 M/SEC
RE-DELTA-STAR= 10610.

DELTA STAR= .4814 CM
RE-THETA= 8068.

THETA= .3659 CM
NUWALL= .1714 CM**2/SEC

H= 1.315

LEAST SQUARE FIT PARAMETERS

UTAH= 1.3837 M/SEC
CHISQR= .2197E-04

CF= .002676
YMAX= 3.138 CM

PI= .6139
YMIN= .086 CM

DELTA= 3.4060 CM

| Y (CM) | Y/THETA | Y-PLUS | M/ME | RHO/RHOF | U/UE | U-PLUS | TAU/TAU-MAX | V/U |
|--------|---------|--------|--------|----------|--------|--------|-------------|----------|
| 0.000 | 0.000 | 0. | 0.0000 | 1.0000 | 0.0000 | 0.00 | 1.0000 | 0.000000 |
| .031 | .086 | 75. | .4774 | 1.0000 | .4774 | 13.03 | 1.0000 | 0.000000 |
| .035 | .095 | 28. | .4894 | 1.0000 | .4894 | 13.36 | .9998 | .000001 |
| .040 | .110 | 32. | .5127 | 1.0000 | .5127 | 14.00 | .9994 | .000003 |
| .046 | .127 | 37. | .5287 | 1.0000 | .5287 | 14.43 | .9990 | .000005 |
| .058 | .160 | 47. | .5426 | 1.0000 | .5426 | 14.81 | .9983 | .000009 |
| .065 | .177 | 52. | .5562 | 1.0000 | .5562 | 15.19 | .9978 | .000011 |
| .073 | .199 | 59. | .5622 | 1.0000 | .5622 | 15.35 | .9972 | .000014 |
| .086 | .236 | 69. | .5783 | 1.0000 | .5783 | 15.79 | .9967 | .000019 |
| .101 | .277 | 82. | .5854 | 1.0000 | .5854 | 15.98 | .9951 | .000024 |
| .117 | .321 | 94. | .5938 | 1.0000 | .5938 | 16.71 | .9938 | .000029 |
| .133 | .364 | 107. | .6036 | 1.0000 | .6036 | 16.48 | .9924 | .000034 |
| .169 | .467 | 136. | .6226 | 1.0000 | .6226 | 17.00 | .9892 | .000046 |
| .196 | .537 | 158. | .6384 | 1.0000 | .6384 | 17.43 | .9866 | .000055 |
| .231 | .633 | 187. | .6488 | 1.0000 | .6488 | 17.71 | .9830 | .000066 |
| .263 | .720 | 212. | .6589 | 1.0000 | .6589 | 17.99 | .9797 | .000077 |
| .323 | .884 | 261. | .6800 | 1.0000 | .6800 | 18.57 | .9729 | .000097 |
| .355 | .971 | 287. | .6910 | 1.0000 | .6910 | 18.87 | .9690 | .000108 |
| .435 | 1.188 | 351. | .7065 | 1.0000 | .7065 | 19.29 | .9589 | .000136 |
| .514 | 1.405 | 415. | .7239 | 1.0000 | .7239 | 19.77 | .9478 | .000165 |
| .677 | 1.852 | 547. | .7532 | 1.0000 | .7532 | 20.57 | .9218 | .000228 |
| .833 | 2.277 | 672. | .7749 | 1.0000 | .7749 | 21.16 | .8930 | .000293 |
| .995 | 2.719 | 803. | .7983 | 1.0000 | .7983 | 21.80 | .8582 | .000368 |
| 1.149 | 3.140 | 927. | .8218 | 1.0000 | .8218 | 22.44 | .8205 | .000445 |
| 1.308 | 3.574 | 1056. | .8389 | 1.0000 | .8389 | 22.91 | .7767 | .000530 |
| 1.627 | 4.447 | 1314. | .8757 | 1.0000 | .8757 | 23.91 | .6735 | .000718 |
| 1.943 | 5.309 | 1568. | .9102 | 1.0000 | .9102 | 24.85 | .5549 | .000918 |
| 2.263 | 6.185 | 1827. | .9373 | 1.0000 | .9373 | 25.59 | .4229 | .001127 |
| 2.578 | 7.044 | 2081. | .9609 | 1.0000 | .9609 | 26.24 | .2912 | .001324 |
| 2.897 | 7.915 | 2338. | .9815 | 1.0000 | .9815 | 26.80 | .1660 | .001503 |
| 3.054 | 8.345 | 2465. | .9857 | 1.0000 | .9857 | 26.92 | .1106 | .001560 |
| 3.138 | 8.575 | 2533. | .9899 | 1.0000 | .9899 | 27.03 | .0835 | .001617 |
| 3.295 | 9.004 | 2660. | .9941 | 1.0000 | .9941 | 27.14 | .0386 | .001678 |
| 3.376 | 9.276 | 2726. | .9958 | 1.0000 | .9958 | 27.19 | .0186 | .001705 |
| 3.525 | 9.633 | 2846. | .9983 | 1.0000 | .9983 | 27.26 | 0.0000 | .001731 |
| 3.611 | 9.868 | 2915. | 1.0000 | 1.0000 | 1.0000 | 27.30 | 0.0000 | .001731 |

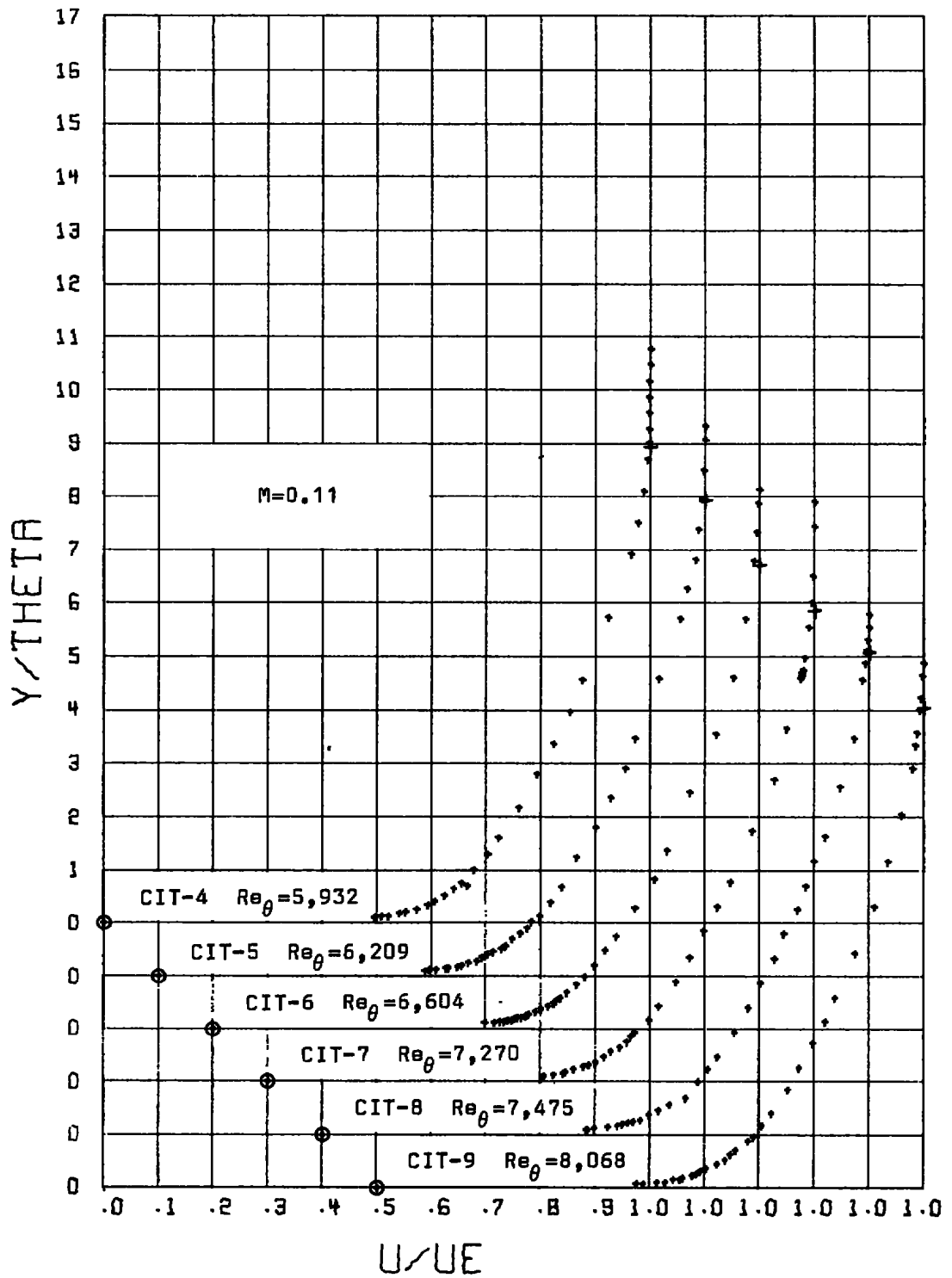


Figure A1. Mean Velocity Profiles.

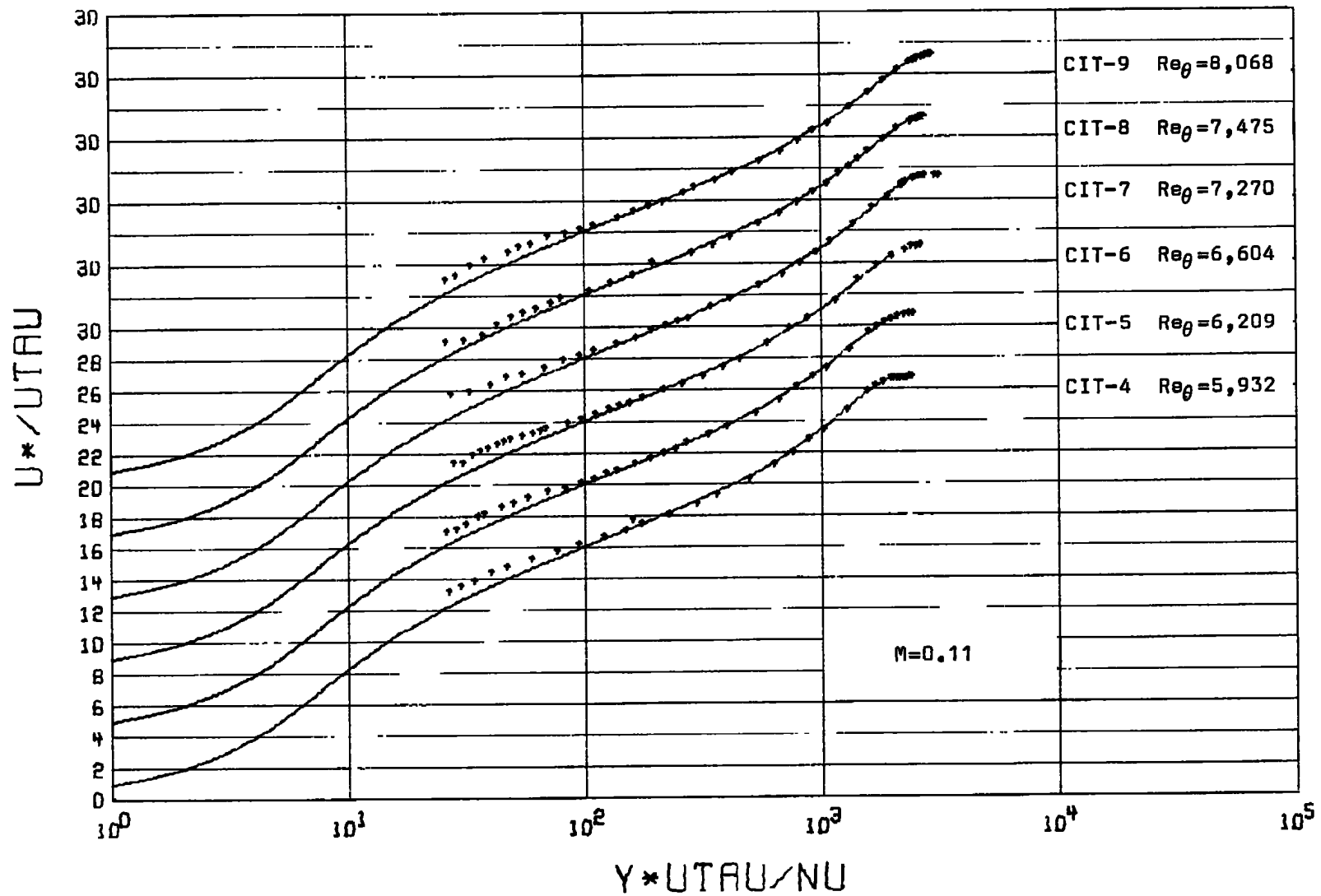


Figure A2. Van Driest Scaled Mean Velocity Profiles.

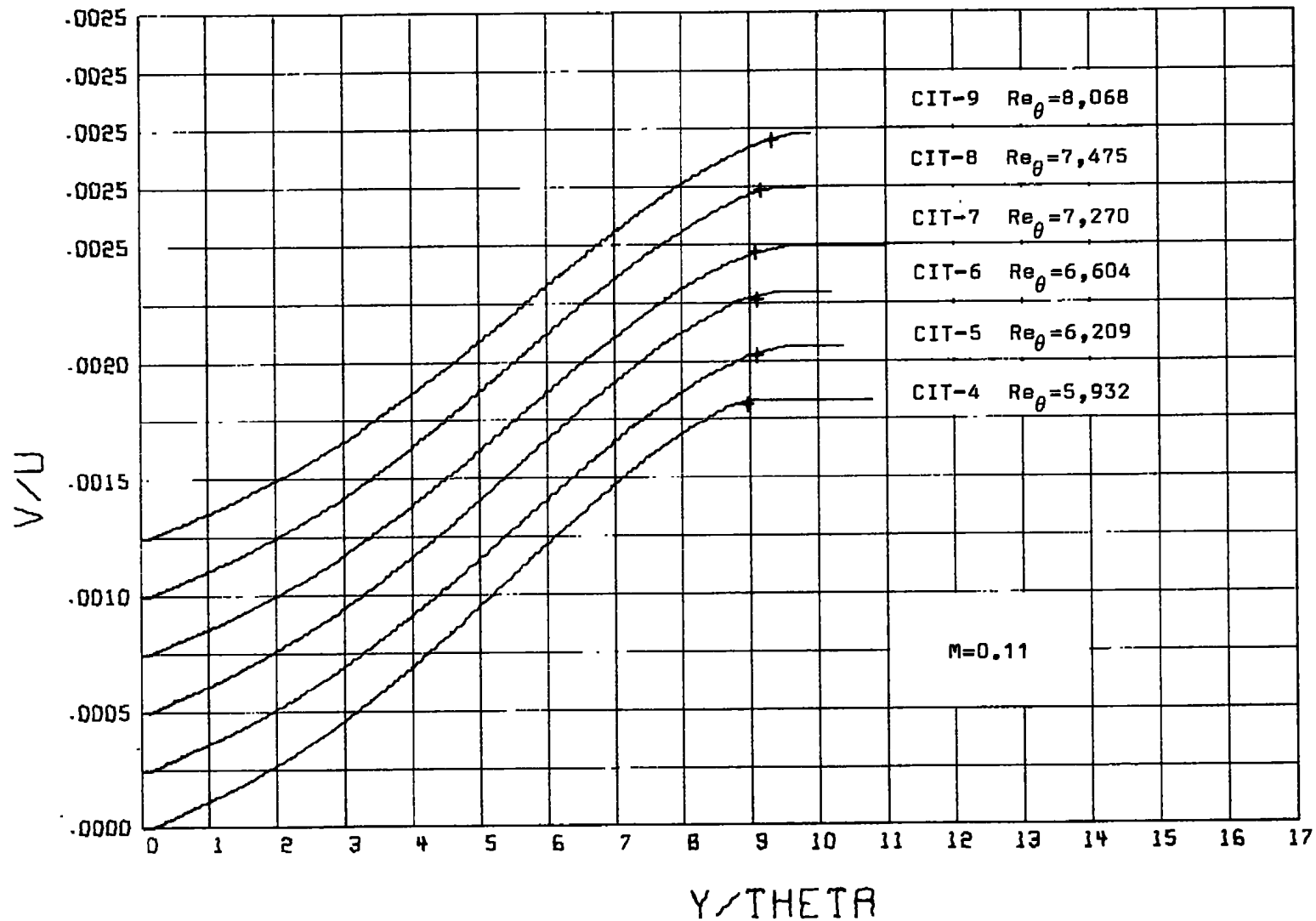


Figure A3. Normal Velocity Distribution.

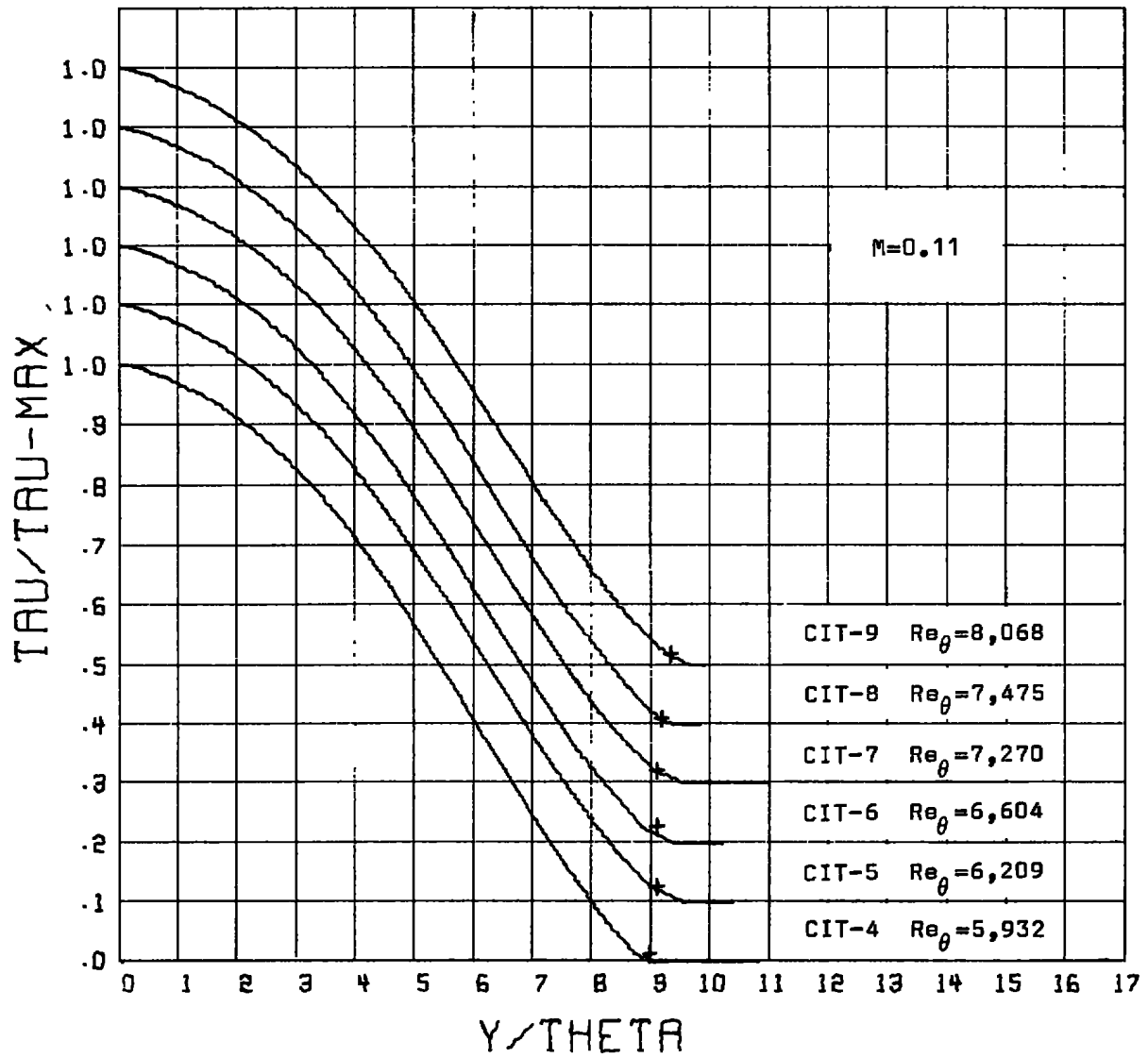


Figure A4. Shear Stress Distribution.

TABLE A 5. DATA SUMMARY
PROFILE - JPL-1 - - - PITOT PRESSURE DATA

EDGE MACH NO.= .5927
X=-48.43 CM

TOTAL PRESSURE= .6665E+05 N/M**2
TOTAL TEMPERATURE= 305.73 DEG-K

UE= 201.05 M/SFC
RE-DELTA-STAR= 27510.

DELTA STAR= .3796 CM
RE-THETA= 18870.

THETA= .2604 CM
NUWALL= .3128 CM**2/SEC

M= 1.457

LEAST SQUARE FIT PARAMETERS

UTAU= 6.8401 M/SEC
CHISQR= .1455E-04

CF= .002179
YMAX= 2.340 CM

PI= .7613
YMIN= .069 CM

DELTA= 2.4827 CM

| Y (CM) | Y/THETA | Y-PLUS | M/ME | RHO/RHNE | U/UF | U-PLUS | TAU/TAU-MAX | V/U |
|--------|---------|--------|--------|----------|--------|--------|-------------|----------|
| 0.000 | 0.000 | 0. | 0.0000 | .9414 | 0.0000 | 0.00 | 1.0000 | 0.000000 |
| .010 | .039 | 22. | .3695 | .9494 | .3792 | 11.16 | 1.0000 | 0.000000 |
| .019 | .073 | 41. | .4757 | .9547 | .4868 | 14.34 | .9994 | .000003 |
| .035 | .136 | 77. | .5252 | .9576 | .5367 | 15.82 | .9982 | .000009 |
| .049 | .268 | 152. | .5845 | .9614 | .5961 | 17.58 | .9950 | .000021 |
| .101 | .390 | 222. | .6065 | .9629 | .6180 | 18.23 | .9917 | .000032 |
| .130 | .507 | 286. | .6218 | .9640 | .6333 | 18.69 | .9882 | .000042 |
| .157 | .604 | 344. | .6394 | .9653 | .6508 | 19.20 | .9849 | .000052 |
| .182 | .702 | 399. | .6579 | .9668 | .6691 | 19.75 | .9815 | .000061 |
| .213 | .819 | 466. | .6640 | .9672 | .6751 | 19.93 | .9772 | .000073 |
| .226 | .867 | 494. | .6791 | .9684 | .6901 | 20.38 | .9753 | .000077 |
| .261 | 1.004 | 572. | .6901 | .9693 | .7009 | 20.70 | .9698 | .000091 |
| .294 | 1.131 | 644. | .6876 | .9691 | .6984 | 20.62 | .9645 | .000104 |
| .316 | 1.213 | 691. | .7043 | .9704 | .7149 | 21.12 | .9608 | .000113 |
| .345 | 1.326 | 755. | .7141 | .9713 | .7245 | 21.40 | .9557 | .000125 |
| .388 | 1.491 | 849. | .7185 | .9716 | .7289 | 21.53 | .9476 | .000143 |
| .425 | 1.633 | 930. | .7314 | .9727 | .7416 | 21.91 | .9402 | .000159 |
| .449 | 1.725 | 983. | .7358 | .9731 | .7459 | 22.04 | .9352 | .000170 |
| .505 | 1.940 | 1105. | .7543 | .9747 | .7640 | 22.58 | .9228 | .000196 |
| .548 | 2.106 | 1199. | .7582 | .9751 | .7678 | 22.70 | .9125 | .000217 |
| .577 | 2.218 | 1263. | .7646 | .9756 | .7740 | 22.88 | .9052 | .000232 |
| .617 | 2.369 | 1349. | .7764 | .9767 | .7856 | 23.23 | .8948 | .000252 |
| .651 | 2.501 | 1424. | .7760 | .9767 | .7852 | 23.22 | .8853 | .000271 |
| .685 | 2.632 | 1499. | .7853 | .9775 | .7943 | 23.49 | .8754 | .000290 |
| .741 | 2.947 | 1621. | .7957 | .9785 | .8044 | 23.79 | .8582 | .000322 |
| .787 | 3.022 | 1721. | .7989 | .9788 | .8075 | 23.89 | .8433 | .000349 |
| .839 | 3.222 | 1835. | .8143 | .9802 | .8225 | 24.33 | .8252 | .000382 |
| .904 | 3.471 | 1977. | .8249 | .9812 | .8327 | 24.64 | .8011 | .000424 |
| .944 | 3.627 | 2066. | .8330 | .9820 | .8405 | 24.88 | .7852 | .000452 |
| .989 | 3.797 | 2163. | .8342 | .9822 | .8417 | 24.91 | .7670 | .000483 |
| 1.049 | 4.027 | 2293. | .8450 | .9832 | .8521 | 25.23 | .7412 | .000526 |
| 1.102 | 4.231 | 2410. | .8590 | .9846 | .8656 | 25.63 | .7170 | .000566 |
| 1.158 | 4.446 | 2532. | .8567 | .9844 | .8635 | 25.57 | .6904 | .000609 |
| 1.206 | 4.631 | 2638. | .8721 | .9859 | .8783 | 26.01 | .6667 | .000646 |
| 1.248 | 4.792 | 2729. | .8792 | .9867 | .8851 | 26.22 | .6453 | .000679 |
| 1.308 | 5.021 | 2860. | .8786 | .9866 | .8945 | 26.20 | .6139 | .000728 |
| 1.363 | 5.236 | 2982. | .8924 | .9880 | .8978 | 26.60 | .5836 | .000774 |
| 1.422 | 5.460 | 3110. | .9067 | .9895 | .9115 | 27.01 | .5509 | .000822 |
| 1.480 | 5.684 | 3238. | .9092 | .9898 | .9138 | 27.08 | .5175 | .000871 |
| 1.540 | 5.913 | 3368. | .9251 | .9915 | .9291 | 27.54 | .4826 | .000921 |
| 1.602 | 6.152 | 3504. | .9285 | .9919 | .9323 | 27.64 | .4457 | .000973 |

| Y (CM) | Y/THETA | Y-PLUS | TABLE A 5. (CONT.) | | U/U _E | U-PLUS | TAU/TAU-MAX | V/U |
|--------|---------|--------|--------------------|----------|------------------|--------|-------------|---------|
| | | | M/ME | RHN/RHNE | | | | |
| 1.663 | 6.386 | 3638. | .9360 | .9927 | .9394 | 27.85 | .4092 | .001024 |
| 1.729 | 6.640 | 3782. | .9420 | .9934 | .9451 | 28.02 | .3696 | .001079 |
| 1.744 | 6.849 | 3901. | .9452 | .9937 | .9492 | 28.17 | .3369 | .001123 |
| 1.832 | 7.035 | 4007. | .9522 | .9945 | .9548 | 28.32 | .3082 | .001161 |
| 1.877 | 7.205 | 4104. | .9550 | .9949 | .9574 | 28.40 | .2820 | .001196 |
| 1.929 | 7.405 | 4218. | .9647 | .9959 | .9667 | 28.68 | .2518 | .001236 |
| 1.982 | 7.610 | 4335. | .9650 | .9959 | .9670 | 28.69 | .2215 | .001275 |
| 2.039 | 7.829 | 4460. | .9763 | .9972 | .9777 | 29.01 | .1900 | .001316 |
| 2.092 | 8.034 | 4576. | .9775 | .9974 | .9788 | 29.04 | .1617 | .001352 |
| 2.164 | 8.307 | 4732. | .9885 | .9986 | .9892 | 29.36 | .1258 | .001398 |
| 2.227 | 8.551 | 4871. | .9864 | .9984 | .9872 | 29.30 | .0957 | .001436 |
| 2.282 | 8.761 | 4990. | .9924 | .9991 | .9929 | 29.47 | .0720 | .001465 |
| 2.340 | 8.985 | 5118. | .9915 | .9990 | .9920 | 29.44 | .0484 | .001495 |
| 2.397 | 9.204 | 5243. | .9952 | .9994 | .9954 | 29.55 | .0277 | .001520 |
| 2.461 | 9.448 | 5382. | .9931 | .9991 | .9935 | 29.49 | .0074 | .001545 |
| 2.509 | 9.633 | 5487. | .9970 | .9996 | .9972 | 29.60 | 0.0000 | .001554 |
| 2.562 | 9.838 | 5604. | 1.0014 | 1.0001 | 1.0013 | 29.72 | 0.0000 | .001554 |
| 2.670 | 10.253 | 5840. | 1.0032 | 1.0003 | 1.0030 | 29.78 | 0.0000 | .001554 |
| 2.748 | 10.706 | 6098. | 1.0002 | 1.0000 | 1.0002 | 29.69 | 0.0000 | .001554 |
| 2.903 | 11.145 | 6348. | 1.0045 | 1.0005 | 1.0043 | 29.81 | 0.0000 | .001554 |
| 3.002 | 11.525 | 6565. | 1.0006 | 1.0000 | 1.0006 | 29.70 | 0.0000 | .001554 |
| 3.094 | 11.881 | 6767. | 1.0006 | 1.0000 | 1.0006 | 29.70 | 0.0000 | .001554 |
| 3.191 | 12.251 | 6979. | 1.0041 | 1.0004 | 1.0039 | 29.80 | 0.0000 | .001554 |
| 3.288 | 12.622 | 7190. | .9977 | .9997 | .9978 | 29.62 | 0.0000 | .001554 |
| 3.376 | 12.963 | 7384. | .9981 | .9997 | .9982 | 29.63 | 0.0000 | .001554 |
| 3.455 | 13.266 | 7556. | 1.0025 | 1.0002 | 1.0023 | 29.76 | 0.0000 | .001554 |
| 3.535 | 13.573 | 7731. | .9990 | .9998 | .9991 | 29.66 | 0.0000 | .001554 |

TABLE A 5. (CONT.)
PROFILE - JPL-2 - - PITOT PRESSURE DATA

EDGE MACH NO.= .5927
X=-26.21 CM

TOTAL PRESSURE= .6665E+05 N/M**2
TOTAL TEMPERATURE= 310.10 DEG-K

UE= 202.47 M/SEC
RE-DELTA-STAR= 29060.

DELTA STAR= .4179 CM
RE-THETA= 20180.

THETA= .2902 CM
NUWALL= .3709 CM**2/SEC

H= 1.439

LEAST SQUARE FIT PARAMETERS

UTAU= 6.9226 M/SEC

CF= .002701

PI= .6686

DELTA= 2.8530 CM

CHISQ= .1125E-04

YMAX= 2.672 CM

YMIN= .085 CM

| Y (CM) | Y/THETA | Y-PLUS | M/ME | RHO/RHOF | U/UE | U-PLUS | TAU/TAU-MAX | V/U |
|--------|---------|--------|--------|----------|--------|--------|-------------|----------|
| 0.000 | 0.000 | 0. | 0.0000 | .9414 | 0.0000 | 0.00 | 1.0000 | 0.000000 |
| .010 | .035 | 21. | .3894 | .9503 | .3995 | 11.70 | 1.0000 | 0.000000 |
| .020 | .070 | 43. | .4825 | .9550 | .4437 | 14.47 | .9994 | .000003 |
| .033 | .113 | 71. | .5135 | .9568 | .5250 | 15.39 | .9985 | .000007 |
| .048 | .166 | 104. | .5487 | .9590 | .5598 | 16.47 | .9973 | .000012 |
| .064 | .223 | 139. | .5781 | .9610 | .5897 | 17.30 | .9959 | .000018 |
| .085 | .293 | 183. | .5945 | .9621 | .6061 | 17.79 | .9940 | .000024 |
| .104 | .358 | 224. | .6079 | .9630 | .6195 | 18.18 | .9920 | .000030 |
| .120 | .415 | 260. | .6275 | .9645 | .6389 | 18.76 | .9903 | .000036 |
| .149 | .516 | 323. | .6440 | .9657 | .6554 | 19.25 | .9870 | .000045 |
| .170 | .586 | 367. | .6563 | .9666 | .6676 | 19.61 | .9846 | .000057 |
| .201 | .695 | 435. | .6669 | .9674 | .6780 | 19.92 | .9806 | .000063 |
| .224 | .774 | 484. | .6812 | .9686 | .6922 | 20.34 | .9777 | .000070 |
| .243 | .840 | 526. | .6863 | .9690 | .6977 | 20.49 | .9751 | .000077 |
| .265 | .914 | 572. | .6914 | .9694 | .7022 | 20.63 | .9721 | .000084 |
| .290 | 1.001 | 627. | .6925 | .9695 | .7033 | 20.67 | .9685 | .000093 |
| .316 | 1.089 | 682. | .7097 | .9709 | .7203 | 21.17 | .9647 | .000102 |
| .341 | 1.176 | 736. | .7111 | .9710 | .7216 | 21.21 | .9608 | .000111 |
| .372 | 1.281 | 802. | .7180 | .9716 | .7284 | 21.41 | .9559 | .000122 |
| .426 | 1.470 | 920. | .7274 | .9720 | .7328 | 21.54 | .9467 | .000143 |
| .480 | 1.653 | 1035. | .7416 | .9736 | .7516 | 22.10 | .9371 | .000164 |
| .535 | 1.846 | 1156. | .7484 | .9742 | .7583 | 22.30 | .9263 | .000186 |
| .590 | 2.034 | 1273. | .7624 | .9754 | .7719 | 22.71 | .9150 | .000209 |
| .645 | 2.222 | 1391. | .7694 | .9761 | .7788 | 22.91 | .9030 | .000233 |
| .703 | 2.423 | 1517. | .7892 | .9779 | .7980 | 23.49 | .8893 | .000260 |
| .753 | 2.694 | 1624. | .7869 | .9777 | .7958 | 23.47 | .8770 | .000284 |
| .807 | 2.787 | 1742. | .7991 | .9788 | .8077 | 23.77 | .8626 | .000311 |
| .852 | 2.935 | 1838. | .8081 | .9796 | .8164 | 24.03 | .8503 | .000333 |
| .909 | 3.132 | 1961. | .8128 | .9801 | .8210 | 24.17 | .8336 | .000363 |
| .951 | 3.276 | 2042. | .8198 | .9808 | .8278 | 24.37 | .8208 | .000386 |
| .995 | 3.430 | 2147. | .8274 | .9815 | .8351 | 24.59 | .8066 | .000411 |
| 1.038 | 3.578 | 2241. | .8275 | .9815 | .8352 | 24.59 | .7923 | .000436 |
| 1.087 | 3.745 | 2345. | .8383 | .9826 | .8457 | 24.91 | .7755 | .000465 |
| 1.141 | 3.933 | 2463. | .8485 | .9836 | .8546 | 25.20 | .7559 | .000498 |
| 1.195 | 4.116 | 2578. | .8497 | .9837 | .8567 | 25.24 | .7358 | .000531 |
| 1.245 | 4.291 | 2687. | .8619 | .9849 | .8685 | 25.59 | .7159 | .000563 |
| 1.306 | 4.501 | 2819. | .8646 | .9852 | .8711 | 25.67 | .6911 | .000503 |
| 1.367 | 4.711 | 2950. | .8799 | .9867 | .8858 | 26.11 | .6654 | .000644 |
| 1.426 | 4.913 | 3076. | .8876 | .9870 | .8883 | 26.18 | .6397 | .000684 |
| 1.471 | 5.070 | 3175. | .8879 | .9876 | .8934 | 26.34 | .6191 | .000715 |
| 1.520 | 5.236 | 3279. | .8927 | .9881 | .8990 | 26.47 | .5969 | .000749 |

| Y (CM) | Y/THETA | Y-PLUS | TABLE A 5. (CONT.) | | U/U _E | U-PLUS | TAU/TAU-MAX | V/U |
|--------|---------|--------|--------------------|----------------------|------------------|--------|-------------|---------|
| | | | M/ME | RHO/RHO _E | | | | |
| 1.567 | 5.398 | 3380. | .9005 | .9889 | .9056 | 26.70 | .5747 | .000783 |
| 1.619 | 5.578 | 3493. | .9078 | .9897 | .9125 | 26.91 | .5496 | .000420 |
| 1.668 | 5.748 | 3600. | .9109 | .9900 | .9155 | 27.00 | .5254 | .000855 |
| 1.718 | 5.919 | 3706. | .9181 | .9908 | .9223 | 27.20 | .5007 | .000491 |
| 1.771 | 6.103 | 3821. | .9236 | .9914 | .9276 | 27.36 | .4738 | .000930 |
| 1.832 | 6.313 | 3953. | .9292 | .9920 | .9329 | 27.52 | .4427 | .000974 |
| 1.893 | 6.523 | 4084. | .9358 | .9927 | .9392 | 27.71 | .4114 | .001018 |
| 1.944 | 6.698 | 4194. | .9447 | .9936 | .9472 | 27.95 | .3852 | .001054 |
| 2.005 | 6.908 | 4326. | .9446 | .9936 | .9476 | 27.96 | .3537 | .001097 |
| 2.053 | 7.074 | 4430. | .9530 | .9946 | .9556 | 28.20 | .3288 | .001131 |
| 2.117 | 7.293 | 4567. | .9548 | .9948 | .9573 | 28.25 | .2963 | .001175 |
| 2.165 | 7.459 | 4671. | .9632 | .9957 | .9652 | 28.49 | .2718 | .001208 |
| 2.241 | 7.722 | 4835. | .9673 | .9962 | .9691 | 28.61 | .2339 | .001258 |
| 2.270 | 7.822 | 4898. | .9703 | .9965 | .9720 | 28.70 | .2196 | .001276 |
| 2.325 | 8.010 | 5016. | .9755 | .9971 | .9749 | 28.84 | .1934 | .001311 |
| 2.378 | 8.194 | 5131. | .9784 | .9975 | .9796 | 28.92 | .1685 | .001343 |
| 2.432 | 8.378 | 5246. | .9777 | .9974 | .9790 | 28.90 | .1444 | .001374 |
| 2.479 | 8.540 | 5347. | .9831 | .9980 | .9840 | 29.06 | .1239 | .001400 |
| 2.527 | 8.706 | 5452. | .9868 | .9984 | .9876 | 29.16 | .1036 | .001426 |
| 2.578 | 8.881 | 5561. | .9907 | .9989 | .9913 | 29.28 | .0832 | .001452 |
| 2.626 | 9.047 | 5665. | .9886 | .9986 | .9893 | 29.27 | .0648 | .001475 |
| 2.677 | 9.205 | 5764. | .9949 | .9994 | .9952 | 29.39 | .0483 | .001496 |
| 2.711 | 9.340 | 5849. | .9949 | .9994 | .9952 | 29.39 | .0349 | .001512 |
| 2.764 | 9.524 | 5964. | .9923 | .9991 | .9928 | 29.32 | .0179 | .001533 |
| 2.805 | 9.664 | 6052. | .9963 | .9995 | .9965 | 29.43 | .0060 | .001548 |
| 2.853 | 9.830 | 6156. | .9967 | .9996 | .9969 | 29.45 | 0.0000 | .001556 |
| 2.894 | 9.970 | 6243. | .9976 | .9997 | .9978 | 29.47 | 0.0000 | .001556 |
| 2.980 | 10.268 | 6430. | .9986 | .9998 | .9987 | 29.50 | 0.0000 | .001556 |
| 3.055 | 10.526 | 6591. | .9967 | .9996 | .9969 | 29.45 | 0.0000 | .001556 |
| 3.135 | 10.802 | 6764. | .9986 | .9998 | .9987 | 29.50 | 0.0000 | .001556 |
| 3.204 | 11.038 | 6912. | .9986 | .9998 | .9987 | 29.50 | 0.0000 | .001556 |
| 3.295 | 11.353 | 7109. | 1.0004 | 1.0000 | 1.0004 | 29.55 | 0.0000 | .001556 |
| 3.387 | 11.668 | 7306. | 1.0006 | 1.0000 | 1.0006 | 29.56 | 0.0000 | .001556 |
| 3.465 | 11.939 | 7476. | .9999 | .9999 | .9999 | 29.54 | 0.0000 | .001556 |
| 3.544 | 12.210 | 7646. | 1.0008 | 1.0001 | 1.0008 | 29.56 | 0.0000 | .001556 |

TABLE A 5. (CONT.)
PROFILE - JPL-3 - - - PITOT PRESSURE DATA

FOGF MACH NO.= .5986
X= -7.62 CM

TOTAL PRESSURE= .6665E+05 N/M**2
TOTAL TEMPERATURE= 373.31 DEG-K

UE= 202.13 M/SEC
RE-DELTA-STAR= 31750.

DELTA STAR= .4333 CM
RE-THETA= 22190.

THETA= .3028 CM
NUWALL= .3090 CM**2/SEC

H= 1.430

LEAST SQUARE FIT PARAMETERS

UTAU= 6.9077 M/SEC
CHISQR= .1785E-04

CF= .002196
YMAX= 2.858 CM

PI= .6224
YMIN= .082 CM

DELTA= 3.0444 CM

| Y (CM) | Y/THETA | Y-PLUS | M/ME | RHO/RHOF | U/UE | U-PLUS | TAU/TAU-MAX | V/U |
|--------|---------|--------|--------|----------|--------|--------|-------------|----------|
| 0.000 | 0.000 | 0. | 0.0000 | .9403 | 0.0000 | 0.00 | 1.0000 | 0.000000 |
| .010 | .033 | 27. | .4107 | .9504 | .4213 | 12.35 | 1.0000 | 0.000000 |
| .017 | .058 | 39. | .4796 | .9540 | .4910 | 14.40 | .9995 | .000002 |
| .030 | .100 | 68. | .5306 | .9571 | .5424 | 15.91 | .9987 | .000006 |
| .041 | .138 | 93. | .5556 | .9587 | .5674 | 16.65 | .9979 | .000010 |
| .067 | .222 | 150. | .5811 | .9604 | .5929 | 17.41 | .9958 | .000017 |
| .082 | .277 | 184. | .6038 | .9620 | .6156 | 18.08 | .9945 | .000022 |
| .099 | .327 | 221. | .6127 | .9627 | .6245 | 18.34 | .9929 | .000027 |
| .107 | .356 | 241. | .6271 | .9638 | .6388 | 18.77 | .9920 | .000030 |
| .132 | .436 | 295. | .6372 | .9645 | .6489 | 19.06 | .9895 | .000037 |
| .148 | .490 | 332. | .6533 | .9658 | .6647 | 19.53 | .9877 | .000047 |
| .172 | .570 | 386. | .6570 | .9660 | .6684 | 19.64 | .9850 | .000050 |
| .218 | .721 | 488. | .6811 | .9680 | .6923 | 20.35 | .9795 | .000064 |
| .251 | .830 | 562. | .6847 | .9683 | .6958 | 20.46 | .9754 | .000075 |
| .275 | .909 | 616. | .6981 | .9694 | .7090 | 20.85 | .9722 | .000083 |
| .299 | .989 | 670. | .7072 | .9697 | .7131 | 20.97 | .9689 | .000091 |
| .332 | 1.098 | 743. | .7050 | .9699 | .7158 | 21.05 | .9642 | .000102 |
| .361 | 1.194 | 809. | .7199 | .9712 | .7305 | 21.49 | .9599 | .000111 |
| .392 | 1.295 | 877. | .7266 | .9718 | .7371 | 21.68 | .9552 | .000122 |
| .414 | 1.366 | 925. | .7293 | .9720 | .7397 | 21.76 | .9519 | .000129 |
| .438 | 1.446 | 979. | .7332 | .9724 | .7435 | 21.88 | .9480 | .000138 |
| .471 | 1.555 | 1053. | .7358 | .9726 | .7461 | 21.95 | .9425 | .000150 |
| .501 | 1.656 | 1121. | .7443 | .9733 | .7544 | 22.20 | .9372 | .000161 |
| .534 | 1.765 | 1195. | .7539 | .9742 | .7638 | 22.48 | .9313 | .000173 |
| .577 | 1.907 | 1291. | .7577 | .9745 | .7675 | 22.59 | .9232 | .000190 |
| .614 | 2.029 | 1374. | .7657 | .9753 | .7753 | 22.82 | .9161 | .000204 |
| .642 | 2.121 | 1436. | .7714 | .9758 | .7809 | 22.99 | .9105 | .000215 |
| .683 | 2.255 | 1527. | .7793 | .9765 | .7886 | 23.22 | .9020 | .000232 |
| .741 | 2.448 | 1658. | .7849 | .9770 | .7940 | 23.38 | .8891 | .000257 |
| .781 | 2.578 | 1746. | .7861 | .9772 | .7952 | 23.41 | .8801 | .000274 |
| .829 | 2.737 | 1853. | .7957 | .9781 | .8046 | 23.69 | .8685 | .000295 |
| .882 | 2.914 | 1973. | .8063 | .9791 | .8149 | 24.00 | .8550 | .000320 |
| .947 | 3.111 | 2106. | .8155 | .9800 | .8238 | 24.27 | .8391 | .000348 |
| 1.007 | 3.325 | 2251. | .8247 | .9809 | .8327 | 24.54 | .8209 | .000381 |
| 1.057 | 3.492 | 2364. | .8282 | .9812 | .8361 | 24.64 | .8057 | .000407 |
| 1.113 | 3.677 | 2489. | .8417 | .9826 | .8491 | 25.03 | .7886 | .000436 |
| 1.167 | 3.836 | 2597. | .8450 | .9829 | .8523 | 25.12 | .7731 | .000462 |
| 1.220 | 4.029 | 2728. | .8527 | .9837 | .8597 | 25.34 | .7535 | .000495 |
| 1.267 | 4.184 | 2833. | .8582 | .9842 | .8650 | 25.50 | .7372 | .000522 |
| 1.310 | 4.327 | 2929. | .8609 | .9845 | .8676 | 25.58 | .7217 | .000547 |
| 1.344 | 4.570 | 3094. | .8684 | .9853 | .8748 | 25.79 | .6943 | .000590 |

| TABLE A 5. (CONT.) | | | | | | | | |
|--------------------|---------|--------|--------|----------|--------|---------|-------------|---------|
| Y (CM) | Y/THETA | Y-PLUS | M/MF | RHO/RHOF | U/UF | II-PLUS | TAU/TAU-MAX | V/U |
| 1.433 | 4.733 | 3205. | .8779 | .9863 | .8840 | 26.07 | .6751 | .000621 |
| 1.492 | 4.926 | 3335. | .8827 | .9868 | .8885 | 26.21 | .6519 | .000657 |
| 1.545 | 5.107 | 3455. | .8874 | .9873 | .8931 | 26.34 | .6300 | .000690 |
| 1.598 | 5.278 | 3574. | .8967 | .9883 | .9070 | 26.61 | .6076 | .000724 |
| 1.647 | 5.438 | 3682. | .8987 | .9884 | .9034 | 26.65 | .5869 | .000755 |
| 1.700 | 5.614 | 3801. | .9068 | .9894 | .9117 | 26.90 | .5635 | .000790 |
| 1.760 | 5.811 | 3935. | .9114 | .9899 | .9160 | 27.03 | .5368 | .000829 |
| 1.807 | 5.966 | 4040. | .9184 | .9906 | .9227 | 27.23 | .5155 | .000860 |
| 1.850 | 6.109 | 4136. | .9209 | .9909 | .9251 | 27.30 | .4956 | .000888 |
| 1.925 | 6.356 | 4304. | .9283 | .9917 | .9321 | 27.51 | .4608 | .000938 |
| 1.942 | 6.545 | 4431. | .9302 | .9919 | .9340 | 27.57 | .4339 | .000976 |
| 2.039 | 6.733 | 4559. | .9385 | .9928 | .9419 | 27.81 | .4069 | .001013 |
| 2.104 | 6.947 | 4704. | .9438 | .9934 | .9459 | 27.96 | .3767 | .001056 |
| 2.169 | 7.161 | 4849. | .9569 | .9949 | .9593 | 28.33 | .3455 | .001097 |
| 2.223 | 7.341 | 4971. | .9567 | .9948 | .9587 | 28.31 | .3196 | .001132 |
| 2.242 | 7.568 | 5124. | .9633 | .9957 | .9653 | 28.51 | .2877 | .001175 |
| 2.354 | 7.773 | 5263. | .9647 | .9958 | .9667 | 28.55 | .2590 | .001213 |
| 2.413 | 7.966 | 5394. | .9702 | .9965 | .9719 | 28.71 | .2326 | .001248 |
| 2.457 | 8.113 | 5493. | .9744 | .9969 | .9759 | 28.83 | .2128 | .001273 |
| 2.524 | 8.339 | 5646. | .9776 | .9973 | .9789 | 28.92 | .1830 | .001312 |
| 2.544 | 8.445 | 5732. | .9813 | .9977 | .9824 | 29.03 | .1669 | .001333 |
| 2.616 | 8.637 | 5848. | .9813 | .9977 | .9824 | 29.03 | .1455 | .001360 |
| 2.664 | 8.796 | 5956. | .9858 | .9983 | .9867 | 29.16 | .1263 | .001385 |
| 2.720 | 8.981 | 6081. | .9867 | .9984 | .9875 | 29.18 | .1047 | .001412 |
| 2.771 | 9.148 | 6194. | .9899 | .9988 | .9905 | 29.27 | .0864 | .001435 |
| 2.811 | 9.283 | 6285. | .9956 | .9994 | .9958 | 29.43 | .0722 | .001453 |
| 2.858 | 9.438 | 6390. | .9976 | .9991 | .9930 | 29.35 | .0563 | .001473 |
| 2.928 | 9.668 | 6546. | .9948 | .9993 | .9952 | 29.41 | .0349 | .001500 |
| 2.973 | 9.815 | 6646. | .9991 | .9999 | .9992 | 29.53 | .0222 | .001515 |
| 3.035 | 10.021 | 6785. | .9966 | .9996 | .9968 | 29.46 | .0057 | .001536 |
| 3.077 | 10.159 | 6879. | .9975 | .9997 | .9977 | 29.49 | 0.0000 | .001543 |
| 3.129 | 10.331 | 6995. | .9984 | .9998 | .9985 | 29.51 | 0.0000 | .001543 |
| 3.171 | 10.469 | 7089. | 1.0014 | 1.0001 | 1.0013 | 29.60 | 0.0000 | .001543 |
| 3.201 | 10.570 | 7157. | .9993 | .9999 | .9994 | 29.54 | 0.0000 | .001543 |
| 3.268 | 10.797 | 7307. | .9993 | .9999 | .9994 | 29.54 | 0.0000 | .001543 |
| 3.315 | 10.947 | 7412. | 1.0002 | 1.0000 | 1.0002 | 29.56 | 0.0000 | .001543 |
| 3.367 | 11.102 | 7517. | 1.0002 | 1.0000 | 1.0002 | 29.56 | 0.0000 | .001543 |
| 3.420 | 11.291 | 7645. | .9993 | .9999 | .9994 | 29.54 | 0.0000 | .001543 |
| 3.482 | 11.497 | 7784. | 1.0007 | 1.0000 | 1.0006 | 29.59 | 0.0000 | .001543 |
| 3.539 | 11.685 | 7912. | .9993 | .9999 | .9994 | 29.54 | 0.0000 | .001543 |
| 3.585 | 11.836 | 8014. | 1.0002 | 1.0000 | 1.0002 | 29.56 | 0.0000 | .001543 |
| 3.615 | 11.937 | 8082. | 1.0002 | 1.0000 | 1.0002 | 29.56 | 0.0000 | .001543 |

TABLE A 5. (CONT.)
 PROFILE - JPL-4 - - - PITOT PRESSURE DATA

EDGE MACH NO.= .6018 TOTAL PRESSURE= .6665E+05 N/M**2
 X= 0.00 CM TOTAL TEMPERATURE= 308.65 DEG-K

UE= 204.91 M/SEC DELTA STAR= .4531 CM THETA= .3177 CM H= 1.426
 RE-DELTA-STAR= 31940. RE-THETA= 22400. NUWALL= .3185 CM**2/SEC CF= .002165

LEAST SQUARE FIT PARAMETERS
 UTAU= 7.0079 M/SEC CF= .002198 PI= .5908 DELTA= 3.1670 CM
 CHISQR= .2022E-04 YMAX= 2.995 CM YMIN= .080 CM

| Y (CM) | Y/THETA | Y-PLUS | M/ME | RHO/RHME | U/UE | U-PLUS | TAU/TAU-MAX | V/U |
|--------|---------|--------|--------|----------|--------|--------|-------------|----------|
| 0.000 | 0.000 | 0. | 0.0000 | .9397 | 0.0000 | 0.00 | 1.0000 | 0.000000 |
| .010 | .031 | 22. | .4144 | .9500 | .4252 | 12.45 | 1.0000 | 0.000000 |
| .021 | .067 | 47. | .4862 | .9539 | .4978 | 14.59 | .9993 | .000003 |
| .034 | .107 | 75. | .5360 | .9570 | .5479 | 16.07 | .9985 | .000007 |
| .050 | .159 | 111. | .5640 | .9589 | .5759 | 16.89 | .9973 | .000012 |
| .059 | .187 | 131. | .5863 | .9604 | .5982 | 17.55 | .9965 | .000015 |
| .080 | .251 | 176. | .6012 | .9615 | .6131 | 17.99 | .9948 | .000021 |
| .105 | .331 | 231. | .6170 | .9626 | .6289 | 18.46 | .9924 | .000029 |
| .124 | .391 | 273. | .6375 | .9642 | .6492 | 19.06 | .9905 | .000035 |
| .140 | .471 | 329. | .6488 | .9651 | .6605 | 19.39 | .9878 | .000042 |
| .170 | .535 | 374. | .6548 | .9655 | .6664 | 19.57 | .9855 | .000049 |
| .194 | .611 | 427. | .6604 | .9660 | .6719 | 19.73 | .9827 | .000056 |
| .209 | .659 | 460. | .6706 | .9668 | .6820 | 20.03 | .9809 | .000061 |
| .233 | .735 | 513. | .6763 | .9673 | .6876 | 20.20 | .9780 | .000069 |
| .257 | .811 | 567. | .6980 | .9691 | .7090 | 20.83 | .9749 | .000076 |
| .279 | .879 | 614. | .6976 | .9690 | .7087 | 20.82 | .9721 | .000083 |
| .295 | .931 | 651. | .7074 | .9694 | .7134 | 20.96 | .9699 | .000088 |
| .334 | 1.051 | 734. | .7085 | .9699 | .7194 | 21.14 | .9666 | .000101 |
| .364 | 1.146 | 801. | .7183 | .9708 | .7290 | 21.43 | .9603 | .000111 |
| .402 | 1.266 | 885. | .7308 | .9719 | .7413 | 21.79 | .9546 | .000124 |
| .441 | 1.358 | 950. | .7268 | .9715 | .7373 | 21.68 | .9500 | .000134 |
| .472 | 1.446 | 1039. | .7385 | .9726 | .7488 | 22.02 | .9434 | .000148 |
| .499 | 1.570 | 1098. | .7469 | .9733 | .7571 | 22.26 | .9390 | .000157 |
| .539 | 1.698 | 1187. | .7528 | .9739 | .7629 | 22.43 | .9370 | .000172 |
| .581 | 1.830 | 1279. | .7524 | .9738 | .7625 | 22.42 | .9244 | .000188 |
| .622 | 1.958 | 1369. | .7587 | .9744 | .7686 | 22.60 | .9168 | .000203 |
| .660 | 2.078 | 1453. | .7720 | .9756 | .7816 | 22.99 | .9093 | .000218 |
| .704 | 2.217 | 1550. | .7781 | .9762 | .7875 | 23.17 | .9003 | .000236 |
| .742 | 2.337 | 1634. | .7759 | .9760 | .7853 | 23.10 | .8977 | .000251 |
| .774 | 2.437 | 1704. | .7879 | .9771 | .7970 | 23.45 | .8852 | .000264 |
| .803 | 2.529 | 1768. | .7994 | .9782 | .8082 | 23.79 | .8786 | .000277 |
| .847 | 2.665 | 1863. | .8041 | .9787 | .8128 | 23.92 | .8686 | .000296 |
| .880 | 2.769 | 1936. | .8058 | .9788 | .8145 | 23.97 | .8607 | .000310 |
| .918 | 2.889 | 2020. | .8065 | .9789 | .8151 | 23.99 | .8512 | .000328 |
| .957 | 3.013 | 2106. | .8140 | .9794 | .8224 | 24.21 | .8411 | .000346 |
| 1.007 | 3.169 | 2215. | .8129 | .9795 | .8214 | 24.18 | .8278 | .000369 |
| 1.051 | 3.308 | 2313. | .8270 | .9809 | .8350 | 24.59 | .8155 | .000391 |
| 1.101 | 3.464 | 2422. | .8337 | .9816 | .8415 | 24.78 | .8012 | .000416 |
| 1.141 | 3.592 | 2512. | .8414 | .9824 | .8499 | 25.00 | .7891 | .000437 |
| 1.182 | 3.720 | 2601. | .8431 | .9825 | .8505 | 25.05 | .7766 | .000458 |
| 1.230 | 3.872 | 2707. | .8475 | .9830 | .8547 | 25.18 | .7612 | .000483 |

| Y (CM) | Y/THETA | Y-PLUS | TABLE A 5. (CONT.) | | U/U* | H-PLUS | TAU/TAU-MAX | V/U |
|--------|---------|--------|--------------------|----------|--------|--------|-------------|---------|
| | | | M/ME | RHO/RHOF | | | | |
| 1.278 | 4.024 | 2813. | .8561 | .9839 | .8631 | 25.43 | .7454 | .000510 |
| 1.325 | 4.172 | 2917. | .8556 | .9838 | .8626 | 25.41 | .7295 | .000536 |
| 1.367 | 4.303 | 3009. | .8593 | .9842 | .8662 | 25.52 | .7149 | .000559 |
| 1.405 | 4.423 | 3093. | .8684 | .9851 | .8749 | 25.78 | .7012 | .000581 |
| 1.443 | 4.543 | 3176. | .8731 | .9856 | .8794 | 25.91 | .6873 | .000603 |
| 1.484 | 4.671 | 3266. | .8741 | .9857 | .8804 | 25.94 | .6721 | .000627 |
| 1.532 | 4.823 | 3372. | .8798 | .9863 | .8859 | 26.11 | .6537 | .000656 |
| 1.581 | 4.975 | 3478. | .8829 | .9867 | .8889 | 26.20 | .6348 | .000685 |
| 1.635 | 5.147 | 3599. | .8938 | .9878 | .8992 | 26.51 | .6129 | .000719 |
| 1.682 | 5.295 | 3702. | .8968 | .9882 | .9021 | 26.60 | .5936 | .000748 |
| 1.734 | 5.459 | 3817. | .8987 | .9884 | .9040 | 26.65 | .5718 | .000780 |
| 1.799 | 5.662 | 3959. | .9135 | .9900 | .9180 | 27.07 | .5442 | .000821 |
| 1.870 | 5.886 | 4116. | .9158 | .9902 | .9203 | 27.14 | .5132 | .000867 |
| 1.926 | 6.062 | 4238. | .9217 | .9909 | .9259 | 27.31 | .4885 | .000902 |
| 1.995 | 6.278 | 4389. | .9235 | .9911 | .9276 | 27.36 | .4578 | .000946 |
| 2.043 | 6.430 | 4496. | .9369 | .9926 | .9403 | 27.74 | .4359 | .000977 |
| 2.113 | 6.649 | 4649. | .9332 | .9922 | .9369 | 27.64 | .4042 | .001021 |
| 2.175 | 6.845 | 4786. | .9462 | .9937 | .9492 | 28.01 | .3756 | .001061 |
| 2.227 | 7.009 | 4901. | .9472 | .9938 | .9501 | 28.04 | .3519 | .001093 |
| 2.287 | 7.197 | 5032. | .9508 | .9942 | .9535 | 28.14 | .3247 | .001131 |
| 2.360 | 7.429 | 5194. | .9545 | .9946 | .9571 | 28.25 | .2914 | .001175 |
| 2.407 | 7.577 | 5298. | .9601 | .9952 | .9624 | 28.40 | .2703 | .001204 |
| 2.456 | 7.728 | 5404. | .9633 | .9956 | .9654 | 28.50 | .2489 | .001232 |
| 2.500 | 7.868 | 5502. | .9656 | .9959 | .9676 | 28.56 | .2295 | .001258 |
| 2.559 | 8.052 | 5630. | .9736 | .9968 | .9751 | 28.79 | .2044 | .001291 |
| 2.617 | 8.236 | 5759. | .9779 | .9967 | .9745 | 28.77 | .1798 | .001323 |
| 2.654 | 8.352 | 5840. | .9757 | .9971 | .9771 | 28.85 | .1646 | .001342 |
| 2.710 | 8.528 | 5962. | .9836 | .9980 | .9845 | 29.07 | .1421 | .001372 |
| 2.767 | 8.708 | 6088. | .9845 | .9981 | .9854 | 29.10 | .1199 | .001400 |
| 2.802 | 8.819 | 6166. | .9867 | .9984 | .9875 | 29.16 | .1066 | .001417 |
| 2.851 | 8.971 | 6273. | .9867 | .9984 | .9875 | 29.16 | .0892 | .001439 |
| 2.895 | 9.111 | 6371. | .9880 | .9985 | .9888 | 29.20 | .0736 | .001459 |
| 2.941 | 9.255 | 6471. | .9878 | .9985 | .9885 | 29.19 | .0583 | .001478 |
| 2.995 | 9.427 | 6591. | .9925 | .9991 | .9930 | 29.33 | .0410 | .001500 |
| 3.039 | 9.563 | 6686. | .9900 | .9988 | .9906 | 29.26 | .0280 | .001517 |
| 3.096 | 9.743 | 6812. | .9900 | .9988 | .9906 | 29.26 | .0119 | .001537 |
| 3.136 | 9.871 | 6902. | .9952 | .9994 | .9955 | 29.40 | .0013 | .001550 |
| 3.176 | 9.994 | 6988. | .9965 | .9995 | .9967 | 29.44 | 0.0000 | .001552 |
| 3.225 | 10.151 | 7097. | .9977 | .9991 | .9931 | 29.33 | 0.0000 | .001552 |
| 3.276 | 10.310 | 7209. | .9936 | .9992 | .9940 | 29.36 | 0.0000 | .001552 |
| 3.313 | 10.426 | 7290. | .9945 | .9993 | .9948 | 29.38 | 0.0000 | .001552 |
| 3.374 | 10.618 | 7424. | .9974 | .9996 | .9975 | 29.46 | 0.0000 | .001552 |
| 3.416 | 10.750 | 7516. | .9945 | .9993 | .9948 | 29.38 | 0.0000 | .001552 |
| 3.460 | 10.890 | 7614. | .9978 | .9997 | .9979 | 29.48 | 0.0000 | .001552 |
| 3.514 | 11.057 | 7731. | .9978 | .9997 | .9979 | 29.48 | 0.0000 | .001552 |
| 3.559 | 11.202 | 7832. | .9978 | .9997 | .9979 | 29.48 | 0.0000 | .001552 |
| 3.600 | 11.329 | 7921. | .9983 | .9997 | .9984 | 29.49 | 0.0000 | .001552 |
| 3.648 | 11.481 | 8028. | 1.0081 | 1.0009 | 1.0076 | 29.53 | 0.0000 | .001552 |
| 3.685 | 11.597 | 8109. | .9978 | .9997 | .9979 | 29.48 | 0.0000 | .001552 |

TABLE A 5. (CONT.)
PROFILE - JPL-5 - - - PITOT PRESSURE DATA

EDGE MACH NO.= .5962 TOTAL PRESSURE= .6771E+05 N/M**2
X= 7.62 CM TOTAL TEMPERATURE= 308.89 DEG-K

UE= 203.19 M/SEC DELTA STAR= .4553 CM THETA= .3211 CM H= 1.422
RE-DELTA-STAR= 31710. RE-THETA= 22300. NUWALL= .3136 CM**2/SEC

LEAST SQUARE FIT PARAMETERS
UTAU= 6.9410 M/SEC CF= .002195 PI= .5946 DELTA= 3.2647 CM
CHISQR= .1818E-04 YMAX= 3.069 CM YMIN= .078 CM

| Y (CM) | Y/THETA | Y-PLUS | M/ME | RHO/RHOE | U/UE | U-PLUS | TAU/TAU-MAX | V/U |
|--------|---------|--------|--------|----------|--------|--------|-------------|----------|
| 0.000 | 0.000 | 0. | 0.0000 | .9408 | 0.0000 | 0.00 | 1.0000 | 0.000000 |
| .010 | .031 | 22. | .4087 | .9506 | .4192 | 12.29 | 1.0000 | 0.000000 |
| .012 | .039 | 28. | .4458 | .9525 | .4567 | 13.39 | .9998 | 0.000000 |
| .021 | .067 | 47. | .5178 | .9566 | .5294 | 15.54 | .9993 | .000003 |
| .041 | .130 | 97. | .5541 | .9589 | .5659 | 16.61 | .9980 | .000009 |
| .059 | .186 | 132. | .5820 | .9608 | .5938 | 17.44 | .9967 | .000014 |
| .078 | .245 | 174. | .6045 | .9624 | .6162 | 18.10 | .9951 | .000020 |
| .109 | .341 | 241. | .6219 | .9637 | .6335 | 18.62 | .9923 | .000029 |
| .123 | .384 | 272. | .6256 | .9639 | .6372 | 18.72 | .9909 | .000033 |
| .146 | .456 | 323. | .6455 | .9654 | .6569 | 19.31 | .9886 | .000040 |
| .167 | .523 | 371. | .6569 | .9663 | .6683 | 19.65 | .9863 | .000046 |
| .191 | .598 | 424. | .6618 | .9667 | .6731 | 19.79 | .9837 | .000053 |
| .217 | .678 | 480. | .6811 | .9682 | .6972 | 20.36 | .9808 | .000061 |
| .245 | .765 | 542. | .6858 | .9686 | .6968 | 20.49 | .9774 | .000069 |
| .265 | .829 | 587. | .6910 | .9690 | .7019 | 20.65 | .9749 | .000075 |
| .293 | .916 | 649. | .7021 | .9699 | .7128 | 20.97 | .9714 | .000084 |
| .335 | 1.047 | 742. | .7089 | .9705 | .7196 | 21.17 | .9658 | .000097 |
| .356 | 1.114 | 789. | .7187 | .9713 | .7292 | 21.46 | .9628 | .000104 |
| .387 | 1.209 | 857. | .7266 | .9720 | .7370 | 21.69 | .9585 | .000114 |
| .415 | 1.297 | 919. | .7240 | .9718 | .7344 | 21.61 | .9544 | .000123 |
| .449 | 1.404 | 995. | .7355 | .9728 | .7457 | 21.95 | .9493 | .000134 |
| .485 | 1.515 | 1073. | .7420 | .9734 | .7521 | 22.14 | .9437 | .000146 |
| .508 | 1.584 | 1124. | .7452 | .9736 | .7552 | 22.23 | .9400 | .000154 |
| .529 | 1.654 | 1172. | .7546 | .9745 | .7644 | 22.50 | .9365 | .000161 |
| .562 | 1.757 | 1245. | .7590 | .9749 | .7687 | 22.63 | .9309 | .000173 |
| .599 | 1.872 | 1326. | .7663 | .9755 | .7758 | 22.85 | .9244 | .000186 |
| .632 | 1.975 | 1399. | .7643 | .9755 | .7758 | 22.85 | .9184 | .000198 |
| .665 | 2.078 | 1472. | .7737 | .9762 | .7831 | 23.06 | .9122 | .000210 |
| .708 | 2.213 | 1568. | .7840 | .9771 | .7931 | 23.36 | .9038 | .000227 |
| .741 | 2.316 | 1641. | .7834 | .9771 | .7925 | 23.34 | .8971 | .000240 |
| .767 | 2.395 | 1697. | .7876 | .9775 | .7966 | 23.47 | .8919 | .000250 |
| .798 | 2.494 | 1768. | .7989 | .9785 | .8076 | 23.79 | .8851 | .000262 |
| .842 | 2.629 | 1863. | .7959 | .9783 | .8047 | 23.71 | .8756 | .000280 |
| .872 | 2.724 | 1931. | .8012 | .9788 | .8099 | 23.86 | .8687 | .000293 |
| .913 | 2.851 | 2071. | .7995 | .9786 | .8081 | 23.81 | .8592 | .000310 |
| .947 | 2.959 | 2096. | .8107 | .9797 | .8190 | 24.13 | .8509 | .000325 |
| .988 | 3.085 | 2186. | .8100 | .9796 | .8184 | 24.11 | .8407 | .000343 |
| 1.018 | 3.181 | 2254. | .8198 | .9805 | .8279 | 24.40 | .8329 | .000357 |
| 1.046 | 3.268 | 2316. | .8238 | .9809 | .8318 | 24.52 | .8255 | .000370 |
| 1.090 | 3.407 | 2414. | .8267 | .9812 | .8346 | 24.60 | .8135 | .000391 |
| 1.130 | 3.530 | 2501. | .8380 | .9823 | .8455 | 24.93 | .8025 | .000410 |

| Y (CM) | Y/THETA | Y-PLUS | TABLE A 5. (CONT.) | | U/U* | U-PLUS | TAU/TAU-MAX | V/U |
|--------|---------|--------|--------------------|----------|--------|--------|-------------|---------|
| | | | M/ME | RHO/RHOF | | | | |
| 1.160 | 3.625 | 2569. | .8380 | .9823 | .8455 | 24.93 | .7937 | .000425 |
| 1.183 | 3.696 | 2619. | .8380 | .9823 | .8455 | 24.93 | .7870 | .000436 |
| 1.234 | 3.855 | 2737. | .8425 | .9828 | .8498 | 25.06 | .7717 | .000462 |
| 1.299 | 4.057 | 2875. | .8481 | .9833 | .8552 | 25.22 | .7514 | .000495 |
| 1.327 | 4.145 | 2937. | .8564 | .9842 | .8632 | 25.46 | .7424 | .000510 |
| 1.362 | 4.256 | 3016. | .8608 | .9846 | .8675 | 25.58 | .7307 | .000529 |
| 1.405 | 4.390 | 3111. | .8619 | .9847 | .8686 | 25.62 | .7161 | .000553 |
| 1.437 | 4.490 | 3182. | .8691 | .9855 | .8754 | 25.82 | .7051 | .000570 |
| 1.473 | 4.601 | 3260. | .8658 | .9851 | .8723 | 25.73 | .6926 | .000540 |
| 1.508 | 4.717 | 3339. | .8750 | .9861 | .8812 | 25.99 | .6798 | .000610 |
| 1.544 | 4.823 | 3418. | .8772 | .9863 | .8832 | 26.06 | .6668 | .000630 |
| 1.595 | 4.981 | 3530. | .8831 | .9869 | .8889 | 26.23 | .6478 | .000660 |
| 1.635 | 5.108 | 3670. | .8873 | .9874 | .8930 | 26.35 | .6323 | .000683 |
| 1.676 | 5.235 | 3710. | .8958 | .9883 | .9011 | 26.59 | .6165 | .000707 |
| 1.714 | 5.354 | 3794. | .8898 | .9876 | .8954 | 26.42 | .6014 | .000730 |
| 1.804 | 5.636 | 3994. | .9018 | .9889 | .9059 | 26.77 | .5648 | .000784 |
| 1.855 | 5.795 | 4106. | .9127 | .9901 | .9173 | 27.08 | .5437 | .000815 |
| 1.907 | 5.957 | 4222. | .9121 | .9900 | .9167 | 27.06 | .5218 | .000847 |
| 1.945 | 6.076 | 4306. | .9212 | .9910 | .9254 | 27.32 | .5055 | .000870 |
| 1.996 | 6.235 | 4418. | .9201 | .9909 | .9243 | 27.29 | .4836 | .000907 |
| 2.019 | 6.306 | 4469. | .9256 | .9915 | .9296 | 27.45 | .4737 | .000916 |
| 2.057 | 6.425 | 4553. | .9317 | .9922 | .9354 | 27.62 | .4571 | .000939 |
| 2.123 | 6.632 | 4699. | .9377 | .9928 | .9411 | 27.79 | .4280 | .000980 |
| 2.164 | 6.758 | 4789. | .9380 | .9928 | .9414 | 27.80 | .4101 | .001005 |
| 2.208 | 6.897 | 4888. | .9434 | .9934 | .9465 | 27.96 | .3904 | .001032 |
| 2.247 | 7.020 | 4975. | .9481 | .9940 | .9509 | 28.09 | .3729 | .001056 |
| 2.306 | 7.203 | 5104. | .9513 | .9943 | .9540 | 28.18 | .3470 | .001091 |
| 2.360 | 7.373 | 5225. | .9570 | .9950 | .9594 | 28.34 | .3228 | .001124 |
| 2.395 | 7.480 | 5301. | .9578 | .9951 | .9601 | 28.37 | .3077 | .001144 |
| 2.438 | 7.615 | 5397. | .9600 | .9953 | .9622 | 28.43 | .2888 | .001169 |
| 2.495 | 7.794 | 5523. | .9651 | .9959 | .9671 | 28.58 | .2640 | .001207 |
| 2.537 | 7.925 | 5616. | .9675 | .9962 | .9693 | 28.64 | .2458 | .001226 |
| 2.594 | 8.071 | 5720. | .9721 | .9967 | .9737 | 28.78 | .2261 | .001252 |
| 2.632 | 8.222 | 5827. | .9733 | .9968 | .9748 | 28.81 | .2059 | .001278 |
| 2.663 | 8.317 | 5894. | .9779 | .9974 | .9792 | 28.94 | .1934 | .001294 |
| 2.710 | 8.454 | 5998. | .9816 | .9978 | .9827 | 29.05 | .1744 | .001319 |
| 2.746 | 8.639 | 6122. | .9793 | .9975 | .9805 | 28.98 | .1523 | .001347 |
| 2.797 | 8.738 | 6142. | .9827 | .9979 | .9837 | 29.08 | .1401 | .001363 |
| 2.835 | 8.857 | 6276. | .9866 | .9984 | .9874 | 29.19 | .1257 | .001381 |
| 2.876 | 8.984 | 6366. | .9907 | .9989 | .9912 | 29.30 | .1108 | .001400 |
| 2.908 | 9.083 | 6437. | .9929 | .9991 | .9933 | 29.37 | .0994 | .001415 |
| 2.947 | 9.206 | 6524. | .9893 | .9987 | .9899 | 29.26 | .0856 | .001432 |
| 2.983 | 9.317 | 6602. | .9870 | .9984 | .9878 | 29.20 | .0736 | .001447 |
| 3.030 | 9.464 | 6706. | .9922 | .9990 | .9926 | 29.35 | .0583 | .001466 |
| 3.069 | 9.587 | 6794. | .9933 | .9992 | .9937 | 29.38 | .0461 | .001482 |
| 3.121 | 9.749 | 6909. | .9968 | .9996 | .9970 | 29.48 | .0306 | .001501 |
| 3.168 | 9.896 | 7013. | .9923 | .9991 | .9928 | 29.35 | .0175 | .001517 |
| 3.208 | 10.019 | 7100. | .9959 | .9995 | .9961 | 29.45 | .0069 | .001530 |
| 3.268 | 10.209 | 7235. | .9959 | .9995 | .9961 | 29.45 | 0.0000 | .001539 |
| 3.319 | 10.368 | 7347. | .9979 | .9997 | .9980 | 29.51 | 0.0000 | .001539 |
| 3.387 | 10.578 | 7496. | 1.0026 | 1.0003 | 1.0024 | 29.64 | 0.0000 | .001539 |
| 3.418 | 10.677 | 7567. | 1.0026 | 1.0003 | 1.0024 | 29.64 | 0.0000 | .001539 |
| 3.464 | 10.820 | 7668. | .9997 | .9999 | .9997 | 29.56 | 0.0000 | .001539 |
| 3.553 | 11.098 | 7865. | .9950 | .9994 | .9953 | 29.43 | 0.0000 | .001539 |
| 3.647 | 11.391 | 8073. | 1.0021 | 1.0002 | 1.0020 | 29.63 | 0.0000 | .001539 |
| 3.690 | 11.526 | 8168. | 1.0008 | 1.0001 | 1.0008 | 29.59 | 0.0000 | .001539 |

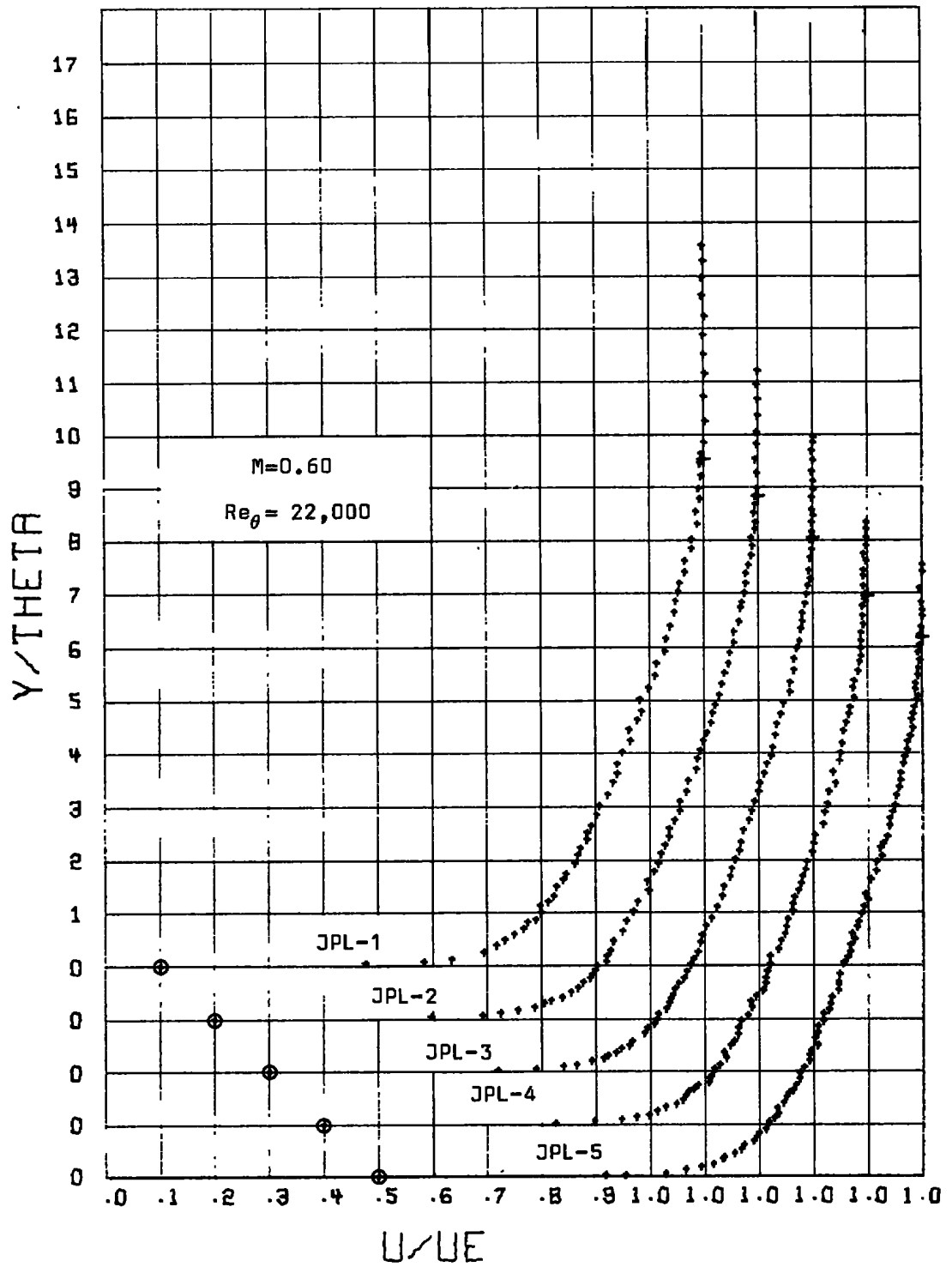


Figure A5. Mean Velocity Profiles.

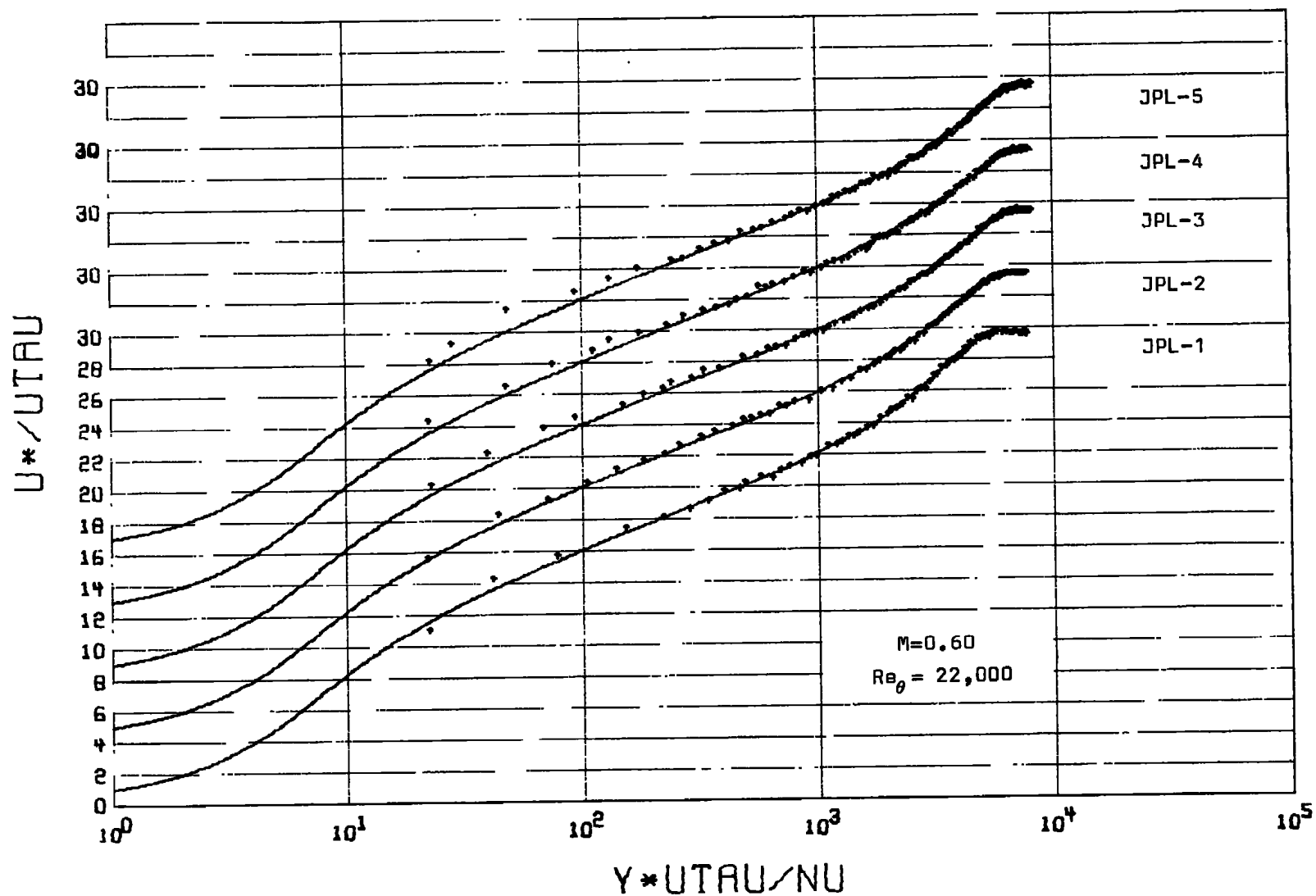


Figure A6. Van Driest Scaled Mean Velocity Profiles.

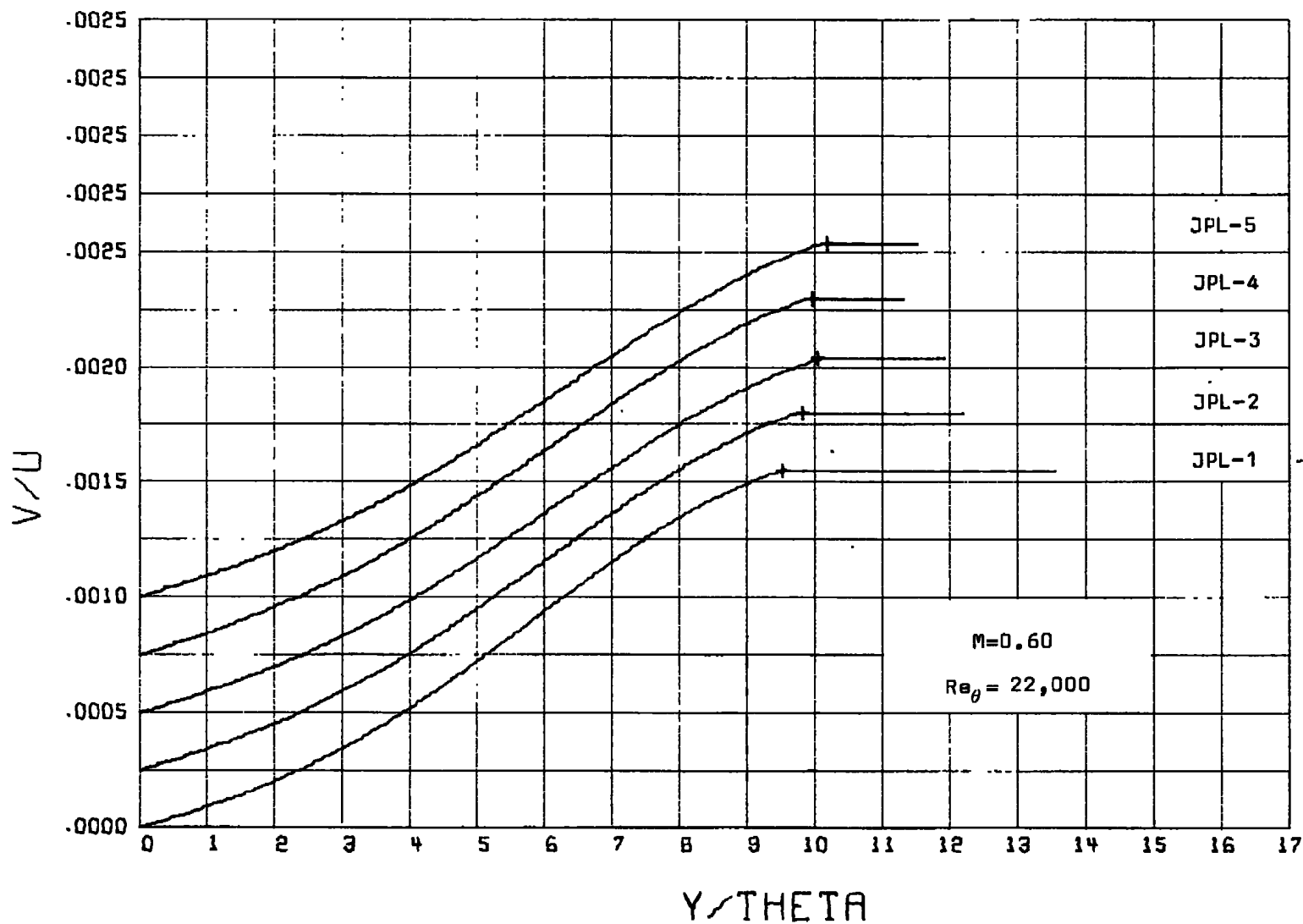


Figure A7. Normal Velocity Distribution.

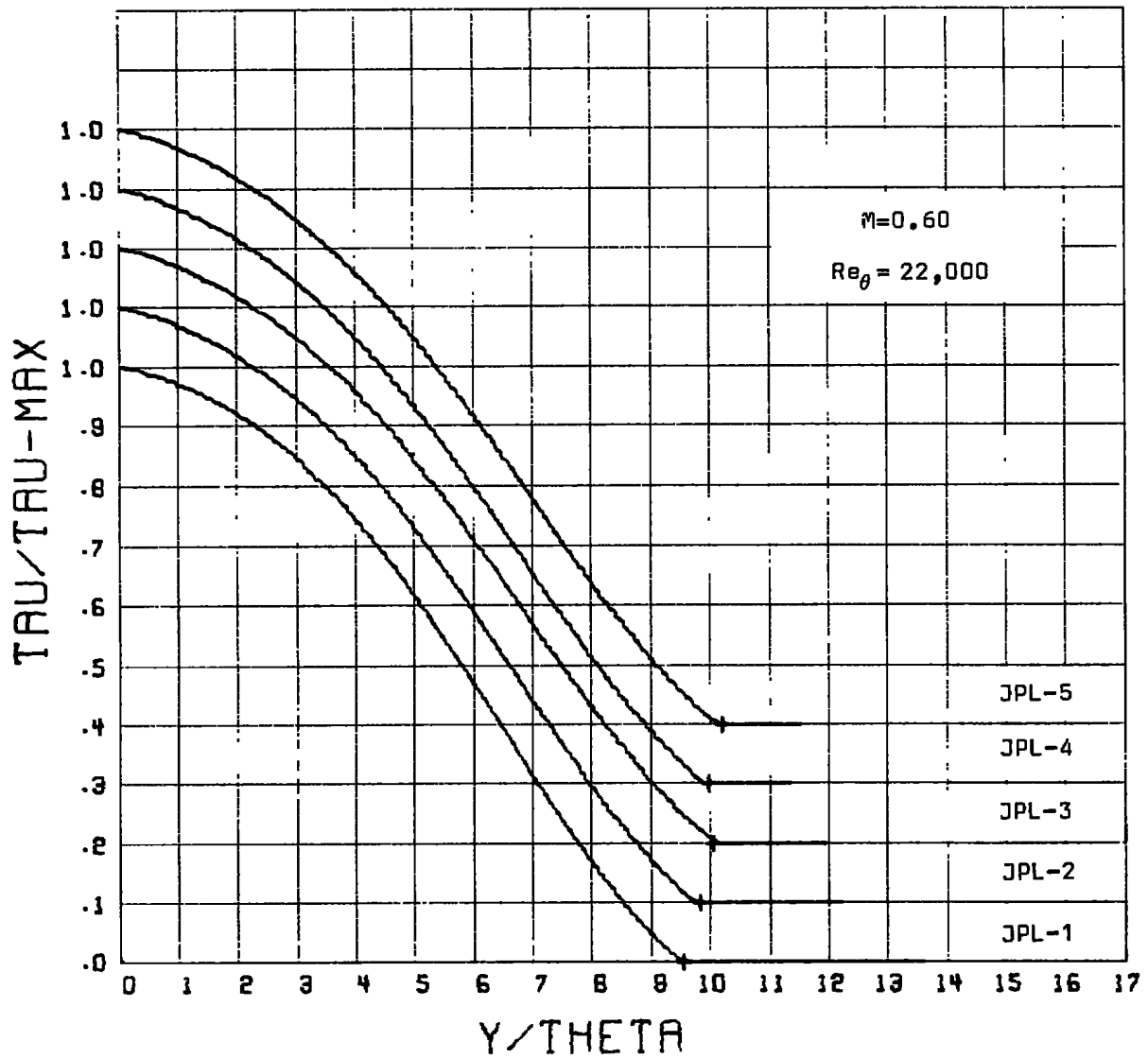


Figure A8. Shear Stress Distribution.

TABLE A 6. DATA SUMMARY
PROFILE - JPL-1 - - - PITOT PRESSURE DATA

EDGE MACH NO.= .5973 TOTAL PRFSSURE= .1263E+06 N/M**2
X=-48.43 CM TOTAL TEMPRATURE= 315.93 DEG-K

UE= 205.88 M/SEC DELTA STAR= .3325 CM THETA= .2344 CM H= 1.418
RE-DELTA-STAR= 44630. RE-THETA= 31460. NUWALL= .1761 CM**2/SEC

LEAST SQUARE FIT PARAMETERS
UTAU= 6.8636 M/SEC CF= .002090 PI= .6124 DELTA= 2.4128 CM
CHISQR= .1056E-04 YMAX= 2.274 CM YMIN= .038 CM

| Y (CM) | Y/THETA | Y-PLUS | M/ME | RHO/RH0E | U/UE | U-PLUS | TAU/TAU-MAX | V/U |
|--------|---------|--------|--------|----------|--------|--------|-------------|----------|
| 0.000 | 0.000 | 0. | 0.0000 | .9405 | 0.0000 | 0.00 | 1.0000 | 0.000000 |
| .010 | .043 | 39. | .4499 | .9526 | .4609 | 13.85 | 1.0000 | 0.000000 |
| .022 | .097 | 89. | .5296 | .9572 | .5413 | 16.28 | .9989 | .000005 |
| .038 | .162 | 148. | .5663 | .9596 | .5781 | 17.40 | .9974 | .000010 |
| .052 | .222 | 202. | .5920 | .9614 | .6038 | 18.17 | .9958 | .000016 |
| .074 | .319 | 292. | .6206 | .9634 | .6373 | 19.04 | .9930 | .000024 |
| .091 | .390 | 356. | .6309 | .9642 | .6425 | 19.35 | .9909 | .000030 |
| .102 | .438 | 400. | .6500 | .9656 | .6614 | 19.92 | .9893 | .000034 |
| .134 | .574 | 524. | .6630 | .9667 | .6743 | 20.32 | .9887 | .000046 |
| .151 | .644 | 589. | .6673 | .9670 | .6786 | 20.44 | .9822 | .000053 |
| .163 | .698 | 638. | .6857 | .9685 | .6968 | 21.00 | .9802 | .000058 |
| .181 | .774 | 707. | .6878 | .9686 | .6988 | 21.06 | .9773 | .000064 |
| .194 | .828 | 757. | .6950 | .9692 | .7059 | 21.28 | .9752 | .000069 |
| .219 | .937 | 856. | .7076 | .9703 | .7183 | 21.65 | .9708 | .000079 |
| .240 | 1.023 | 935. | .7035 | .9699 | .7143 | 21.53 | .9672 | .000087 |
| .255 | 1.088 | 994. | .7203 | .9714 | .7308 | 22.04 | .9644 | .000093 |
| .293 | 1.208 | 1103. | .7276 | .9716 | .7331 | 22.11 | .9591 | .000105 |
| .313 | 1.338 | 1222. | .7330 | .9725 | .7433 | 22.42 | .9530 | .000117 |
| .331 | 1.413 | 1291. | .7396 | .9730 | .7498 | 22.61 | .9494 | .000125 |
| .359 | 1.533 | 1400. | .7452 | .9735 | .7552 | 22.78 | .9435 | .000137 |
| .394 | 1.684 | 1539. | .7518 | .9741 | .7617 | 22.98 | .9356 | .000152 |
| .414 | 1.765 | 1613. | .7574 | .9746 | .7672 | 23.14 | .9313 | .000161 |
| .449 | 1.917 | 1752. | .7647 | .9753 | .7743 | 23.36 | .9278 | .000177 |
| .481 | 2.053 | 1876. | .7722 | .9760 | .7817 | 23.59 | .9149 | .000192 |
| .509 | 2.172 | 1984. | .7791 | .9766 | .7884 | 23.79 | .9077 | .000206 |
| .549 | 2.345 | 2143. | .7857 | .9777 | .7948 | 23.99 | .8967 | .000226 |
| .575 | 2.453 | 2242. | .7958 | .9782 | .8046 | 24.29 | .8895 | .000239 |
| .605 | 2.583 | 2361. | .7975 | .9783 | .8063 | 24.34 | .8807 | .000254 |
| .640 | 2.730 | 2494. | .8010 | .9787 | .8097 | 24.44 | .8703 | .000273 |
| .670 | 2.860 | 2613. | .8058 | .9791 | .8143 | 24.58 | .8607 | .000289 |
| .706 | 3.011 | 2752. | .8127 | .9798 | .8211 | 24.79 | .8491 | .000309 |
| .730 | 3.114 | 2846. | .8188 | .9804 | .8269 | 24.97 | .8409 | .000323 |
| .769 | 3.282 | 2999. | .8271 | .9812 | .8350 | 25.22 | .8271 | .000346 |
| .802 | 3.423 | 3128. | .8321 | .9817 | .8398 | 25.37 | .8150 | .000366 |
| .836 | 3.569 | 3262. | .8347 | .9819 | .8424 | 25.44 | .8020 | .000387 |
| .882 | 3.764 | 3440. | .8439 | .9829 | .8512 | 25.72 | .7840 | .000416 |
| .930 | 3.970 | 3628. | .8481 | .9833 | .8553 | 25.84 | .7641 | .000448 |
| .975 | 4.160 | 3801. | .8602 | .9845 | .8669 | 26.20 | .7449 | .000478 |
| 1.024 | 4.371 | 3994. | .8657 | .9851 | .8722 | 26.36 | .7277 | .000512 |
| 1.065 | 4.545 | 4153. | .8694 | .9854 | .8758 | 26.47 | .7038 | .000540 |
| 1.103 | 4.707 | 4301. | .8789 | .9864 | .8849 | 26.75 | .6855 | .000564 |

| TABLE A 6. (CONT.) | | | | | | | | |
|--------------------|---------|--------|--------|----------|--------|---------|-------------|---------|
| Y (CM) | Y/THETA | Y-PLUS | M/ME | RHO/RHOF | U/UFE | II-PLUS | TAU/TAU-MAX | V/U |
| 1.167 | 4.978 | 4549. | .8850 | .9871 | .8907 | 26.93 | .6539 | .000615 |
| 1.205 | 5.140 | 4697. | .8885 | .9874 | .8941 | 27.03 | .6342 | .000643 |
| 1.240 | 5.292 | 4836. | .8970 | .9894 | .9023 | 27.28 | .6154 | .000670 |
| 1.280 | 5.460 | 4989. | .9030 | .9890 | .9080 | 27.46 | .5943 | .000700 |
| 1.324 | 5.650 | 5162. | .9067 | .9894 | .9115 | 27.57 | .5698 | .000735 |
| 1.365 | 5.823 | 5321. | .9121 | .9900 | .9167 | 27.73 | .5470 | .000767 |
| 1.410 | 6.018 | 5499. | .9177 | .9906 | .9220 | 27.89 | .5207 | .000803 |
| 1.437 | 6.132 | 5603. | .9238 | .9912 | .9279 | 28.07 | .5055 | .000824 |
| 1.482 | 6.371 | 5776. | .9243 | .9913 | .9283 | 28.08 | .4795 | .000859 |
| 1.522 | 6.495 | 5934. | .9377 | .9922 | .9364 | 28.33 | .4555 | .000891 |
| 1.591 | 6.744 | 6162. | .9357 | .9926 | .9392 | 28.42 | .4207 | .000939 |
| 1.621 | 6.917 | 6321. | .9416 | .9932 | .9448 | 28.59 | .3963 | .000970 |
| 1.677 | 7.156 | 6538. | .9482 | .9940 | .9511 | 28.79 | .3627 | .001014 |
| 1.738 | 7.416 | 6776. | .9537 | .9945 | .9558 | 28.93 | .3262 | .001061 |
| 1.783 | 7.605 | 6949. | .9560 | .9948 | .9584 | 29.01 | .2997 | .001094 |
| 1.847 | 7.881 | 7207. | .9688 | .9963 | .9706 | 29.39 | .2616 | .001143 |
| 1.911 | 8.152 | 7449. | .9749 | .9970 | .9763 | 29.56 | .2250 | .001184 |
| 1.967 | 8.391 | 7667. | .9759 | .9971 | .9773 | 29.60 | .1933 | .001227 |
| 2.015 | 8.597 | 7855. | .9796 | .9976 | .9808 | 29.70 | .1674 | .001259 |
| 2.070 | 8.829 | 8068. | .9826 | .9979 | .9836 | 29.79 | .1387 | .001294 |
| 2.112 | 9.008 | 8231. | .9849 | .9982 | .9858 | 29.86 | .1175 | .001320 |
| 2.160 | 9.214 | 8419. | .9879 | .9985 | .9886 | 29.94 | .0942 | .001348 |
| 2.195 | 9.366 | 8558. | .9888 | .9986 | .9895 | 29.97 | .0777 | .001368 |
| 2.233 | 9.528 | 8706. | .9905 | .9988 | .9910 | 30.02 | .0609 | .001388 |
| 2.274 | 9.702 | 8865. | .9924 | .9991 | .9929 | 30.08 | .0439 | .001408 |
| 2.320 | 9.897 | 9043. | .9921 | .9990 | .9926 | 30.07 | .0260 | .001430 |
| 2.368 | 10.103 | 9231. | .9964 | .9995 | .9966 | 30.19 | .0083 | .001450 |
| 2.421 | 10.330 | 9439. | .9948 | .9993 | .9951 | 30.14 | 0.0000 | .001460 |
| 2.459 | 10.493 | 9588. | .9977 | .9997 | .9978 | 30.23 | 0.0000 | .001460 |
| 2.555 | 10.899 | 9959. | .9974 | .9996 | .9975 | 30.22 | 0.0000 | .001460 |
| 2.647 | 11.294 | 10320. | 1.0012 | 1.0001 | 1.0012 | 30.33 | 0.0000 | .001460 |
| 2.759 | 11.771 | 10756. | 1.0019 | 1.0002 | 1.0018 | 30.35 | 0.0000 | .001460 |
| 2.856 | 12.183 | 11132. | 1.0006 | 1.0000 | 1.0006 | 30.31 | 0.0000 | .001460 |
| 2.954 | 12.600 | 11513. | 1.0003 | 1.0000 | 1.0003 | 30.31 | 0.0000 | .001460 |
| 3.037 | 12.957 | 11840. | 1.0017 | 1.0001 | 1.0012 | 30.33 | 0.0000 | .001460 |
| 3.138 | 13.385 | 12231. | 1.0000 | .9999 | 1.0000 | 30.30 | 0.0000 | .001460 |
| 3.219 | 13.732 | 12548. | 1.0003 | 1.0000 | 1.0003 | 30.31 | 0.0000 | .001460 |
| 3.298 | 14.068 | 12855. | 1.0016 | 1.0001 | 1.0015 | 30.34 | 0.0000 | .001460 |
| 3.374 | 14.393 | 13152. | .9987 | .9998 | .9987 | 30.26 | 0.0000 | .001460 |
| 3.455 | 14.740 | 13468. | 1.0006 | 1.0000 | 1.0006 | 30.31 | 0.0000 | .001460 |
| 3.531 | 15.065 | 13765. | .9996 | .9999 | .9996 | 30.29 | 0.0000 | .001460 |
| 3.618 | 15.433 | 14102. | .9980 | .9997 | .9981 | 30.24 | 0.0000 | .001460 |
| 3.709 | 15.823 | 14458. | 1.0006 | 1.0000 | 1.0006 | 30.31 | 0.0000 | .001460 |

TABLE A 6. (CONT.)
PROFILE - JPL-2 - - - PITOT PRESSURE DATA

FDGF MACH NO.= .5964 TOTAL PRESSURE= .1270E+06 N/M**2
X=-26.21 CM TOTAL TEMPRATURE= 324.18 DEG-K

UE= 208.75 M/SFC DFLTA STAR= .3803 CM THETA= .2689 CM H= 1.414
RE-DELTA-STAR= 48550. RE-THETA= 34330. NUWALL= .1832 CM**2/SEC

LEAST SQUARE FIT PARAMETERS
UTAU= 6.8864 M/SEC CF= .002057 PI= .6124 DELTA= 2.7680 CM
CHISQR= .1319F-04 YMAX= 2.602 CM YMIN= .025 CM

| Y (CM) | Y/THETA | Y-PLUS | M/ME | RHO/RHDE | U/UE | U-PLUS | TAU/TAU-MAX | V/U |
|--------|---------|--------|--------|----------|--------|--------|-------------|----------|
| 0.000 | 0.000 | 0. | 0.0000 | .9407 | 0.0000 | 0.00 | 1.0000 | 0.000000 |
| .010 | .037 | 38. | .4484 | .9526 | .4594 | 13.92 | 1.0000 | 0.000000 |
| .026 | .099 | 100. | .5307 | .9574 | .5424 | 16.45 | .9988 | .000005 |
| .054 | .203 | 205. | .5912 | .9614 | .6029 | 18.30 | .9963 | .000014 |
| .076 | .283 | 286. | .6163 | .9632 | .6280 | 19.06 | .9941 | .000021 |
| .100 | .373 | 377. | .6365 | .9647 | .6490 | 19.67 | .9914 | .000028 |
| .121 | .453 | 458. | .6553 | .9662 | .6667 | 20.25 | .9888 | .000035 |
| .139 | .519 | 525. | .6679 | .9667 | .6742 | 20.48 | .9866 | .000041 |
| .160 | .595 | 601. | .6737 | .9676 | .6848 | 20.80 | .9840 | .000047 |
| .190 | .708 | 716. | .6841 | .9684 | .6951 | 21.12 | .9799 | .000057 |
| .201 | .750 | 759. | .6928 | .9692 | .7038 | 21.38 | .9783 | .000061 |
| .228 | .850 | 859. | .7034 | .9700 | .7142 | 21.70 | .9745 | .000069 |
| .261 | .977 | 983. | .7085 | .9705 | .7192 | 21.86 | .9695 | .000080 |
| .281 | 1.048 | 1059. | .7184 | .9713 | .7289 | 22.16 | .9663 | .000087 |
| .317 | 1.180 | 1193. | .7267 | .9720 | .7371 | 22.41 | .9606 | .000099 |
| .353 | 1.312 | 1327. | .7366 | .9729 | .7468 | 22.71 | .9546 | .000112 |
| .383 | 1.426 | 1441. | .7372 | .9729 | .7474 | 22.73 | .9492 | .000122 |
| .415 | 1.544 | 1561. | .7489 | .9739 | .7588 | 23.08 | .9434 | .000134 |
| .452 | 1.681 | 1699. | .7555 | .9745 | .7653 | 23.28 | .9364 | .000148 |
| .471 | 1.752 | 1771. | .7600 | .9749 | .7697 | 23.41 | .9326 | .000155 |
| .500 | 1.860 | 1880. | .7656 | .9754 | .7752 | 23.58 | .9267 | .000166 |
| .548 | 2.040 | 2062. | .7673 | .9756 | .7768 | 23.63 | .9164 | .000185 |
| .568 | 2.115 | 2138. | .7746 | .9763 | .7840 | 23.85 | .9120 | .000193 |
| .594 | 2.210 | 2234. | .7796 | .9767 | .7888 | 24.00 | .9062 | .000204 |
| .633 | 2.356 | 2382. | .7853 | .9772 | .7944 | 24.17 | .8970 | .000220 |
| .659 | 2.451 | 2477. | .7882 | .9775 | .7972 | 24.26 | .8908 | .000231 |
| .683 | 2.540 | 2568. | .7950 | .9782 | .8038 | 24.46 | .8848 | .000241 |
| .716 | 2.663 | 2692. | .7987 | .9785 | .8070 | 24.56 | .8763 | .000256 |
| .753 | 2.800 | 2830. | .8047 | .9791 | .8132 | 24.75 | .8665 | .000273 |
| .777 | 2.890 | 2921. | .8113 | .9797 | .8196 | 24.95 | .8599 | .000284 |
| .816 | 3.036 | 3069. | .8174 | .9803 | .8256 | 25.13 | .8486 | .000303 |
| .840 | 3.126 | 3160. | .8172 | .9803 | .8253 | 25.13 | .8416 | .000315 |
| .876 | 3.258 | 3294. | .8301 | .9815 | .8378 | 25.51 | .8308 | .000332 |
| .906 | 3.372 | 3408. | .8286 | .9814 | .8365 | 25.47 | .8214 | .000348 |
| .938 | 3.490 | 3527. | .8346 | .9820 | .8422 | 25.65 | .8112 | .000364 |
| .960 | 3.570 | 3609. | .8377 | .9823 | .8452 | 25.74 | .8041 | .000375 |
| .984 | 3.660 | 3699. | .8399 | .9825 | .8473 | 25.81 | .7960 | .000388 |
| 1.018 | 3.787 | 3828. | .8423 | .9827 | .8497 | 25.88 | .7843 | .000407 |
| 1.051 | 3.910 | 3952. | .8500 | .9835 | .8571 | 26.11 | .7726 | .000425 |
| 1.084 | 4.033 | 4076. | .8524 | .9838 | .8594 | 26.18 | .7606 | .000443 |
| 1.109 | 4.127 | 4177. | .8595 | .9845 | .8663 | 26.39 | .7511 | .000458 |

| Y (CM) | Y/THETA | Y-PLUS | TABLE A 6. (CONT.) M/ME | RHO/RHOE | U/UE | U-PLUS | TAU/TAU-MAX | V/U |
|--------|---------|--------|----------------------------|----------|--------|--------|-------------|---------|
| 1.136 | 4.226 | 4272. | .8593 | .9845 | .8660 | 26.38 | .7410 | .000473 |
| 1.168 | 4.344 | 4392. | .8652 | .9851 | .8717 | 26.56 | .7287 | .000492 |
| 1.196 | 4.448 | 4497. | .8705 | .9856 | .8768 | 26.72 | .7177 | .000508 |
| 1.221 | 4.543 | 4592. | .8744 | .9860 | .8805 | 26.83 | .7074 | .000523 |
| 1.254 | 4.666 | 4716. | .8728 | .9858 | .8790 | 26.79 | .6938 | .000543 |
| 1.242 | 4.769 | 4821. | .8780 | .9864 | .8840 | 26.94 | .6821 | .000561 |
| 1.313 | 4.883 | 4936. | .8871 | .9873 | .8928 | 27.21 | .6691 | .000580 |
| 1.343 | 4.996 | 5050. | .8860 | .9872 | .8917 | 27.18 | .6558 | .000599 |
| 1.376 | 5.119 | 5174. | .8880 | .9874 | .8937 | 27.24 | .6412 | .000620 |
| 1.408 | 5.237 | 5294. | .8952 | .9882 | .9005 | 27.45 | .6269 | .000640 |
| 1.446 | 5.379 | 5437. | .9010 | .9888 | .9061 | 27.62 | .6094 | .000664 |
| 1.474 | 5.483 | 5542. | .9070 | .9894 | .9118 | 27.80 | .5964 | .000683 |
| 1.510 | 5.615 | 5676. | .9071 | .9895 | .9119 | 27.80 | .5796 | .000706 |
| 1.534 | 5.705 | 5766. | .9078 | .9895 | .9126 | 27.83 | .5680 | .000722 |
| 1.564 | 5.819 | 5881. | .9129 | .9901 | .9175 | 27.98 | .5533 | .000742 |
| 1.600 | 5.950 | 6015. | .9176 | .9906 | .9219 | 28.11 | .5359 | .000766 |
| 1.630 | 6.064 | 6129. | .9177 | .9906 | .9220 | 28.12 | .5208 | .000786 |
| 1.661 | 6.177 | 6244. | .9224 | .9911 | .9265 | 28.26 | .5056 | .000806 |
| 1.699 | 6.319 | 6387. | .9284 | .9918 | .9322 | 28.43 | .4864 | .000832 |
| 1.720 | 6.399 | 6468. | .9263 | .9915 | .9302 | 28.37 | .4754 | .000847 |
| 1.760 | 6.565 | 6616. | .9348 | .9925 | .9383 | 28.62 | .4554 | .000873 |
| 1.791 | 6.663 | 6736. | .9345 | .9925 | .9380 | 28.62 | .4391 | .000894 |
| 1.826 | 6.791 | 6864. | .9387 | .9929 | .9421 | 28.74 | .4215 | .000917 |
| 1.861 | 6.923 | 6998. | .9439 | .9935 | .9470 | 28.89 | .4032 | .000941 |
| 1.894 | 7.046 | 7122. | .9471 | .9939 | .9501 | 28.99 | .3861 | .000963 |
| 1.932 | 7.188 | 7265. | .9499 | .9942 | .9527 | 29.07 | .3664 | .000988 |
| 1.971 | 7.329 | 7409. | .9517 | .9944 | .9543 | 29.12 | .3467 | .001013 |
| 2.004 | 7.452 | 7533. | .9575 | .9950 | .9598 | 29.29 | .3295 | .001034 |
| 2.037 | 7.575 | 7657. | .9603 | .9953 | .9625 | 29.38 | .3129 | .001055 |
| 2.072 | 7.707 | 7791. | .9632 | .9957 | .9653 | 29.46 | .2948 | .001078 |
| 2.100 | 7.811 | 7896. | .9633 | .9957 | .9654 | 29.47 | .2806 | .001095 |
| 2.124 | 7.901 | 7984. | .9660 | .9960 | .9680 | 29.55 | .2685 | .001110 |
| 2.161 | 8.038 | 8125. | .9674 | .9962 | .9693 | 29.59 | .2502 | .001133 |
| 2.214 | 8.236 | 8325. | .9728 | .9968 | .9744 | 29.75 | .2241 | .001165 |
| 2.254 | 8.397 | 8488. | .9778 | .9974 | .9791 | 29.89 | .2034 | .001190 |
| 2.303 | 8.567 | 8659. | .9785 | .9974 | .9797 | 29.91 | .1819 | .001214 |
| 2.349 | 8.770 | 8865. | .9845 | .9981 | .9854 | 30.09 | .1571 | .001246 |
| 2.400 | 8.926 | 9022. | .9828 | .9979 | .9838 | 30.04 | .1386 | .001268 |
| 2.452 | 9.119 | 9218. | .9884 | .9986 | .9891 | 30.20 | .1165 | .001294 |
| 2.504 | 9.313 | 9414. | .9891 | .9987 | .9897 | 30.22 | .0954 | .001319 |
| 2.542 | 9.454 | 9557. | .9911 | .9989 | .9916 | 30.28 | .0807 | .001336 |
| 2.602 | 9.676 | 9781. | .9917 | .9990 | .9922 | 30.30 | .0589 | .001362 |
| 2.654 | 9.870 | 9977. | .9940 | .9992 | .9944 | 30.37 | .0412 | .001383 |
| 2.702 | 10.050 | 10158. | .9976 | .9997 | .9977 | 30.47 | .0260 | .001400 |
| 2.753 | 10.238 | 10349. | .9956 | .9994 | .9959 | 30.42 | .0114 | .001417 |
| 2.828 | 10.517 | 10631. | .9979 | .9997 | .9980 | 30.48 | 0.0000 | .001431 |
| 2.877 | 10.701 | 10817. | .9973 | .9996 | .9974 | 30.46 | 0.0000 | .001431 |
| 2.992 | 11.126 | 11247. | .9976 | .9997 | .9977 | 30.47 | 0.0000 | .001431 |
| 3.106 | 11.551 | 11677. | .9995 | .9999 | .9996 | 30.53 | 0.0000 | .001431 |
| 3.185 | 11.844 | 11973. | .9989 | .9998 | .9990 | 30.51 | 0.0000 | .001431 |
| 3.240 | 12.236 | 12369. | .9980 | .9997 | .9981 | 30.48 | 0.0000 | .001431 |
| 3.371 | 12.538 | 12674. | .9999 | .9999 | .9999 | 30.54 | 0.0000 | .001431 |
| 3.455 | 12.850 | 12989. | .9980 | .9997 | .9981 | 30.48 | 0.0000 | .001431 |
| 3.545 | 13.185 | 13328. | 1.0008 | 1.0001 | 1.0008 | 30.57 | 0.0000 | .001431 |
| 3.619 | 13.459 | 13605. | .9999 | .9999 | .9999 | 30.54 | 0.0000 | .001431 |
| 3.693 | 13.733 | 13882. | 1.0002 | 1.0000 | 1.0002 | 30.55 | 0.0000 | .001431 |

TABLE A 6. (CONT.)
 PROFILE - JPL-3 - - - PITOT PRESSURE DATA

EDGE MACH NO.= .5952 TOTAL PRESSURE= .1266E+06 N/M**2
 X= -7.62 CM TOTAL TEMPERATURE= 318.36 DEG-K

UE= 205.97 M/SEC DELTA STAR= .3948 CM THETA= .2801 CM H= 1.409
 RE-DELTA-STAR= 52540. RE-THETA= 37280. NUWALL= .1776 CM**2/SEC

LEAST SQUARE FIT PARAMETERS
 UTAU= 6.8091 M/SEC CF= .002056 PI= .5733 DELTA= 2.9440 CM
 CHISQR= .8678E-05 YMAX= 2.759 CM YMIN= .033 CM

| Y (CM) | Y/THETA | Y-PLUS | M/ME | RHO/RHOE | U/UE | U-PLUS | TAU/TAU-MAX | V/U |
|--------|---------|--------|--------|----------|--------|--------|-------------|----------|
| 0.000 | 0.000 | 0. | 0.0000 | .9409 | 0.0000 | 0.00 | 1.0000 | 0.000000 |
| .010 | .036 | 38. | .4257 | .9516 | .4364 | 13.22 | 1.0000 | 0.000000 |
| .016 | .058 | 63. | .4683 | .9539 | .4795 | 14.53 | .9995 | .000002 |
| .033 | .117 | 126. | .5394 | .9581 | .5510 | 16.72 | .9983 | .000007 |
| .054 | .194 | 209. | .5874 | .9613 | .5991 | 18.18 | .9963 | .000013 |
| .074 | .267 | 287. | .6152 | .9633 | .6268 | 19.03 | .9943 | .000020 |
| .100 | .358 | 384. | .6370 | .9645 | .6435 | 19.54 | .9916 | .000027 |
| .107 | .385 | 413. | .6483 | .9657 | .6597 | 20.04 | .9907 | .000030 |
| .130 | .466 | 501. | .6587 | .9665 | .6700 | 20.35 | .9880 | .000037 |
| .152 | .543 | 584. | .6675 | .9668 | .6738 | 20.47 | .9853 | .000043 |
| .166 | .593 | 637. | .6732 | .9677 | .6844 | 20.79 | .9836 | .000048 |
| .191 | .684 | 735. | .6865 | .9688 | .6975 | 21.20 | .9802 | .000055 |
| .214 | .766 | 822. | .6942 | .9694 | .7050 | 21.43 | .9771 | .000063 |
| .247 | .883 | 949. | .7052 | .9703 | .7159 | 21.76 | .9724 | .000073 |
| .265 | .947 | 1017. | .7139 | .9710 | .7245 | 22.03 | .9698 | .000079 |
| .295 | 1.056 | 1134. | .7247 | .9719 | .7351 | 22.35 | .9652 | .000089 |
| .328 | 1.174 | 1261. | .7250 | .9720 | .7354 | 22.36 | .9600 | .000100 |
| .359 | 1.282 | 1377. | .7387 | .9731 | .7488 | 22.78 | .9550 | .000110 |
| .410 | 1.464 | 1572. | .7529 | .9744 | .7627 | 23.20 | .9463 | .000127 |
| .443 | 1.582 | 1699. | .7574 | .9748 | .7671 | 23.34 | .9404 | .000139 |
| .469 | 1.677 | 1801. | .7670 | .9757 | .7765 | 23.63 | .9354 | .000148 |
| .501 | 1.790 | 1923. | .7640 | .9754 | .7735 | 23.54 | .9294 | .000159 |
| .532 | 1.899 | 2040. | .7705 | .9760 | .7799 | 23.73 | .9234 | .000171 |
| .577 | 2.062 | 2215. | .7811 | .9769 | .7903 | 24.05 | .9140 | .000184 |
| .617 | 2.184 | 2346. | .7810 | .9769 | .7901 | 24.05 | .9066 | .000201 |
| .628 | 2.243 | 2410. | .7891 | .9777 | .7981 | 24.29 | .9030 | .000208 |
| .666 | 2.379 | 2556. | .7953 | .9783 | .8041 | 24.48 | .8944 | .000223 |
| .692 | 2.470 | 2653. | .7970 | .9784 | .8057 | 24.53 | .8885 | .000233 |
| .722 | 2.579 | 2770. | .8039 | .9791 | .8125 | 24.74 | .8812 | .000246 |
| .760 | 2.715 | 2916. | .8031 | .9790 | .8116 | 24.71 | .8718 | .000262 |
| .788 | 2.815 | 3023. | .8121 | .9799 | .8203 | 24.98 | .8646 | .000274 |
| .816 | 2.914 | 3130. | .8153 | .9802 | .8235 | 25.08 | .8573 | .000286 |
| .839 | 2.996 | 3218. | .8170 | .9803 | .8251 | 25.13 | .8512 | .000296 |
| .880 | 3.141 | 3374. | .8224 | .9809 | .8304 | 25.29 | .8400 | .000315 |
| .911 | 3.254 | 3496. | .8264 | .9812 | .8342 | 25.41 | .8309 | .000330 |
| .938 | 3.349 | 3598. | .8318 | .9818 | .8394 | 25.57 | .8230 | .000342 |
| .974 | 3.476 | 3734. | .8388 | .9825 | .8462 | 25.78 | .8175 | .000359 |
| 1.012 | 3.612 | 3880. | .8390 | .9825 | .8464 | 25.78 | .8007 | .000374 |
| 1.032 | 3.685 | 3958. | .8450 | .9831 | .8523 | 25.97 | .7942 | .000388 |
| 1.045 | 3.803 | 4085. | .8460 | .9832 | .8532 | 26.00 | .7835 | .000405 |
| 1.108 | 3.957 | 4250. | .8475 | .9833 | .8546 | 26.04 | .7691 | .000427 |

| Y (CM) | Y/THETA | Y-PLUS | TABLE A 6. (CONT.) M/ME | RHO/RHNE | U/U _F | U-PLUS | TAU/TAU-MAX | V/U |
|--------|---------|--------|----------------------------|----------|------------------|--------|-------------|---------|
| 1.140 | 4.070 | 4372. | .8551 | .9841 | .8620 | 26.27 | .7582 | .000444 |
| 1.170 | 4.179 | 4489. | .8622 | .9848 | .8688 | 26.48 | .7475 | .000460 |
| 1.207 | 4.311 | 4630. | .8648 | .9851 | .8713 | 26.55 | .7343 | .000480 |
| 1.277 | 4.560 | 4898. | .8709 | .9857 | .8771 | 26.73 | .7082 | .000519 |
| 1.310 | 4.678 | 5024. | .8753 | .9862 | .8814 | 26.87 | .6955 | .000537 |
| 1.355 | 4.836 | 5195. | .8761 | .9867 | .8821 | 26.89 | .6780 | .000563 |
| 1.395 | 4.981 | 5351. | .8896 | .9876 | .8951 | 27.29 | .6616 | .000587 |
| 1.426 | 5.090 | 5468. | .8898 | .9877 | .8954 | 27.30 | .6490 | .000604 |
| 1.464 | 5.226 | 5614. | .8940 | .9881 | .8993 | 27.42 | .6331 | .000627 |
| 1.508 | 5.385 | 5784. | .8969 | .9884 | .9021 | 27.51 | .6140 | .000654 |
| 1.549 | 5.530 | 5940. | .9053 | .9893 | .9102 | 27.76 | .5963 | .000679 |
| 1.586 | 5.661 | 6081. | .9079 | .9896 | .9127 | 27.84 | .5800 | .000701 |
| 1.629 | 5.815 | 6247. | .9096 | .9898 | .9143 | 27.89 | .5605 | .000729 |
| 1.662 | 5.933 | 6373. | .9146 | .9903 | .9190 | 28.03 | .5455 | .000748 |
| 1.697 | 6.060 | 6510. | .9200 | .9909 | .9242 | 28.20 | .5290 | .000771 |
| 1.731 | 6.178 | 6636. | .9230 | .9912 | .9271 | 28.28 | .5136 | .000791 |
| 1.769 | 6.314 | 6782. | .9248 | .9914 | .9288 | 28.34 | .4957 | .000815 |
| 1.789 | 6.387 | 6860. | .9268 | .9916 | .9306 | 28.39 | .4861 | .000828 |
| 1.828 | 6.527 | 7011. | .9310 | .9921 | .9347 | 28.52 | .4673 | .000853 |
| 1.868 | 6.668 | 7162. | .9349 | .9925 | .9394 | 28.63 | .4484 | .000878 |
| 1.906 | 6.804 | 7308. | .9381 | .9929 | .9414 | 28.73 | .4299 | .000902 |
| 1.960 | 6.999 | 7518. | .9410 | .9932 | .9442 | 28.82 | .4034 | .000936 |
| 2.000 | 7.139 | 7668. | .9452 | .9937 | .9482 | 28.94 | .3842 | .000960 |
| 2.034 | 7.262 | 7800. | .9511 | .9943 | .9538 | 29.11 | .3675 | .000987 |
| 2.068 | 7.384 | 7931. | .9518 | .9944 | .9544 | 29.13 | .3507 | .001003 |
| 2.095 | 7.479 | 8034. | .9539 | .9946 | .9564 | 29.20 | .3378 | .001019 |
| 2.150 | 7.674 | 8243. | .9594 | .9953 | .9617 | 29.36 | .3114 | .001053 |
| 2.175 | 7.765 | 8340. | .9604 | .9954 | .9626 | 29.39 | .2991 | .001068 |
| 2.218 | 7.919 | 8506. | .9626 | .9956 | .9646 | 29.45 | .2784 | .001094 |
| 2.261 | 8.073 | 8672. | .9669 | .9961 | .9688 | 29.58 | .2579 | .001119 |
| 2.299 | 8.209 | 8818. | .9710 | .9966 | .9727 | 29.70 | .2398 | .001141 |
| 2.330 | 8.318 | 8934. | .9750 | .9970 | .9765 | 29.82 | .2258 | .001158 |
| 2.372 | 8.467 | 9095. | .9741 | .9969 | .9756 | 29.79 | .2066 | .001182 |
| 2.418 | 8.631 | 9270. | .9758 | .9971 | .9771 | 29.84 | .1860 | .001206 |
| 2.456 | 8.767 | 9417. | .9791 | .9975 | .9803 | 29.94 | .1692 | .001227 |
| 2.485 | 8.871 | 9528. | .9795 | .9976 | .9807 | 29.95 | .1565 | .001242 |
| 2.529 | 9.029 | 9699. | .9841 | .9981 | .9850 | 30.09 | .1376 | .001265 |
| 2.620 | 9.351 | 10045. | .9865 | .9984 | .9873 | 30.15 | .1011 | .001309 |
| 2.670 | 9.533 | 10239. | .9907 | .9989 | .9913 | 30.28 | .0817 | .001331 |
| 2.713 | 9.687 | 10405. | .9901 | .9988 | .9907 | 30.26 | .0659 | .001349 |
| 2.759 | 9.850 | 10580. | .9921 | .9990 | .9926 | 30.32 | .0498 | .001368 |
| 2.815 | 10.049 | 10794. | .9928 | .9991 | .9932 | 30.34 | .0315 | .001390 |
| 2.868 | 10.167 | 10921. | .9937 | .9992 | .9941 | 30.37 | .0212 | .001407 |
| 2.899 | 10.349 | 11116. | .9960 | .9995 | .9963 | 30.44 | .0063 | .001419 |
| 2.948 | 10.525 | 11306. | .9970 | .9996 | .9972 | 30.46 | 0.0000 | .001426 |
| 2.971 | 10.607 | 11393. | .9976 | .9997 | .9978 | 30.48 | 0.0000 | .001426 |
| 3.067 | 10.947 | 11759. | .9967 | .9996 | .9969 | 30.45 | 0.0000 | .001426 |
| 3.153 | 11.255 | 12090. | 1.0000 | .9999 | 1.0000 | 30.55 | 0.0000 | .001426 |
| 3.249 | 11.600 | 12460. | .9993 | .9999 | .9993 | 30.53 | 0.0000 | .001426 |
| 3.298 | 11.772 | 12645. | 1.0000 | .9999 | 1.0000 | 30.55 | 0.0000 | .001426 |
| 3.380 | 12.067 | 12961. | 1.0006 | 1.0000 | 1.0006 | 30.57 | 0.0000 | .001426 |
| 3.445 | 12.298 | 13210. | .9990 | .9998 | .9990 | 30.52 | 0.0000 | .001426 |
| 3.521 | 12.570 | 13502. | 1.0003 | 1.0000 | 1.0003 | 30.56 | 0.0000 | .001426 |
| 3.571 | 12.783 | 13731. | .9993 | .9999 | .9993 | 30.53 | 0.0000 | .001426 |
| 3.625 | 12.942 | 13901. | 1.0009 | 1.0001 | 1.0009 | 30.58 | 0.0000 | .001426 |
| 3.689 | 13.168 | 14144. | .9990 | .9998 | .9990 | 30.52 | 0.0000 | .001426 |

TABLE A 6. (CONT.)
 PROFILE - JPL-4 - - - PITOT PRESSURE DATA

EDGE MACH NO.= .5931 TOTAL PRESSURE= .1269E+06 N/M**2
 X= 0.00 CM TOTAL TEMPERATURE= 323.70 DEG-K

UE= 207.02 M/SEC DELTA STAR= .4039 CM THETA= .2876 CM H= 1.404
 RE-DELTA-STAR= 51210. RE-THETA= 36470. NUWALL= .1822 CM**2/SEC CF= .001994

LEAST SQUARE FIT PARAMETERS
 UTAU= 6.8575 M/SEC CF= .002065 PI= .5509 DELTA= 3.0563 CM
 CHISOR= .1842E-04 YMAX= 2.891 CM YMIN= .052 CM

| Y (CM) | Y/THETA | Y-PLUS | M/ME | RHO/RHOF | U/UE | U-PLUS | TAU/TAU-MAX | V/U |
|--------|---------|--------|--------|----------|--------|--------|-------------|----------|
| 0.000 | 0.000 | 0. | 0.0000 | .9413 | 0.0000 | 0.00 | 1.0000 | 0.000000 |
| .010 | .035 | 38. | .4342 | .9524 | .4449 | 13.45 | 1.0000 | 0.000000 |
| .024 | .083 | 90. | .5340 | .9580 | .5455 | 16.51 | .9990 | .000004 |
| .039 | .136 | 147. | .5654 | .9601 | .5771 | 17.48 | .9978 | .000009 |
| .052 | .180 | 195. | .5926 | .9619 | .6042 | 18.30 | .9967 | .000012 |
| .077 | .269 | 291. | .6167 | .9636 | .6282 | 19.04 | .9942 | .000020 |
| .091 | .317 | 344. | .6381 | .9652 | .6495 | 19.69 | .9928 | .000024 |
| .110 | .383 | 415. | .6443 | .9657 | .6556 | 19.87 | .9907 | .000030 |
| .128 | .445 | 482. | .6565 | .9666 | .6678 | 20.25 | .9887 | .000035 |
| .148 | .516 | 558. | .6685 | .9675 | .6796 | 20.61 | .9863 | .000041 |
| .177 | .618 | 669. | .6822 | .9686 | .6932 | 21.02 | .9876 | .000050 |
| .194 | .675 | 731. | .6938 | .9695 | .7046 | 21.37 | .9805 | .000055 |
| .219 | .763 | 824. | .6989 | .9700 | .7096 | 21.53 | .9771 | .000063 |
| .247 | .860 | 931. | .7049 | .9705 | .7155 | 21.71 | .9733 | .000071 |
| .276 | .962 | 1041. | .7109 | .9710 | .7215 | 21.89 | .9691 | .000080 |
| .302 | 1.050 | 1137. | .7227 | .9719 | .7330 | 22.24 | .9654 | .000088 |
| .323 | 1.125 | 1218. | .7292 | .9725 | .7394 | 22.44 | .9621 | .000095 |
| .364 | 1.266 | 1371. | .7380 | .9733 | .7480 | 22.70 | .9557 | .000108 |
| .393 | 1.368 | 1481. | .7413 | .9735 | .7513 | 22.80 | .9509 | .000118 |
| .422 | 1.470 | 1591. | .7463 | .9740 | .7562 | 22.95 | .9460 | .000127 |
| .455 | 1.585 | 1715. | .7642 | .9756 | .7737 | 23.49 | .9403 | .000139 |
| .488 | 1.699 | 1840. | .7589 | .9751 | .7685 | 23.33 | .9343 | .000150 |
| .521 | 1.814 | 1964. | .7693 | .9760 | .7787 | 23.65 | .9282 | .000162 |
| .565 | 1.964 | 2126. | .7740 | .9764 | .7832 | 23.79 | .9199 | .000177 |
| .607 | 2.110 | 2284. | .7807 | .9771 | .7898 | 23.99 | .9114 | .000192 |
| .657 | 2.286 | 2475. | .7852 | .9775 | .7941 | 24.12 | .9007 | .000211 |
| .695 | 2.419 | 2619. | .7985 | .9787 | .8071 | 24.52 | .8924 | .000226 |
| .740 | 2.574 | 2786. | .8003 | .9789 | .8088 | 24.57 | .8822 | .000244 |
| .781 | 2.715 | 2939. | .8089 | .9797 | .8172 | 24.83 | .8725 | .000260 |
| .824 | 2.865 | 3102. | .8180 | .9806 | .8261 | 25.10 | .8619 | .000278 |
| .871 | 3.028 | 3278. | .8195 | .9807 | .8275 | 25.15 | .8499 | .000298 |
| .910 | 3.165 | 3426. | .8176 | .9805 | .8257 | 25.09 | .8395 | .000315 |
| .951 | 3.307 | 3580. | .8323 | .9819 | .8399 | 25.53 | .8283 | .000334 |
| .985 | 3.426 | 3709. | .8366 | .9824 | .8441 | 25.66 | .8186 | .000349 |
| 1.045 | 3.633 | 3933. | .8389 | .9826 | .8442 | 25.73 | .8010 | .000377 |
| 1.087 | 3.779 | 4091. | .8437 | .9831 | .8510 | 25.87 | .7882 | .000397 |
| 1.136 | 3.951 | 4277. | .8512 | .9838 | .8582 | 26.10 | .7726 | .000421 |
| 1.192 | 4.110 | 4449. | .8579 | .9845 | .8646 | 26.29 | .7576 | .000444 |
| 1.225 | 4.260 | 4617. | .8666 | .9854 | .8730 | 26.55 | .7430 | .000467 |
| 1.266 | 4.401 | 4765. | .8682 | .9855 | .8745 | 26.60 | .7289 | .000488 |
| 1.296 | 4.507 | 4880. | .8669 | .9854 | .8733 | 26.56 | .7181 | .000504 |

TABLE A 6. (CONT.)
M/ME RHO/RHOF

| Y (CM) | Y/THETA | Y-PLUS | M/ME | RHO/RHOF | U/UE | U-PLUS | TAU/TAU-MAX | V/U |
|--------|---------|--------|--------|----------|--------|--------|-------------|---------|
| 1.360 | 4.728 | 5119. | .8791 | .9866 | .8850 | 26.92 | .6949 | .000538 |
| 1.410 | 4.905 | 5310. | .8812 | .9869 | .8870 | 26.99 | .6757 | .000566 |
| 1.447 | 5.033 | 5449. | .8840 | .9871 | .8897 | 27.07 | .6614 | .000587 |
| 1.503 | 5.277 | 5659. | .8913 | .9879 | .8967 | 27.28 | .6393 | .000618 |
| 1.555 | 5.408 | 5855. | .8954 | .9883 | .9007 | 27.41 | .6181 | .000648 |
| 1.596 | 5.549 | 6008. | .9002 | .9888 | .9053 | 27.55 | .6013 | .000671 |
| 1.649 | 5.735 | 6209. | .9124 | .9901 | .9169 | 27.91 | .5784 | .000703 |
| 1.695 | 5.894 | 6381. | .9142 | .9903 | .9186 | 27.96 | .5590 | .000730 |
| 1.734 | 6.031 | 6529. | .9163 | .9905 | .9206 | 28.02 | .5418 | .000753 |
| 1.774 | 6.167 | 6677. | .9210 | .9911 | .9251 | 28.17 | .5244 | .000777 |
| 1.817 | 6.318 | 6839. | .9271 | .9917 | .9309 | 28.34 | .5051 | .000803 |
| 1.865 | 6.486 | 7021. | .9279 | .9918 | .9317 | 28.37 | .4833 | .000832 |
| 1.929 | 6.706 | 7260. | .9343 | .9925 | .9378 | 28.56 | .4543 | .000870 |
| 1.974 | 6.845 | 7432. | .9407 | .9932 | .9439 | 28.75 | .4332 | .000897 |
| 2.023 | 7.033 | 7614. | .9424 | .9934 | .9455 | 28.80 | .4108 | .000926 |
| 2.059 | 7.161 | 7752. | .9491 | .9941 | .9519 | 28.99 | .3937 | .000948 |
| 2.104 | 7.315 | 7920. | .9492 | .9942 | .9520 | 29.00 | .3731 | .000975 |
| 2.153 | 7.488 | 8106. | .9540 | .9947 | .9565 | 29.14 | .3500 | .001004 |
| 2.189 | 7.611 | 8240. | .9572 | .9950 | .9595 | 29.23 | .3335 | .001025 |
| 2.239 | 7.784 | 8427. | .9603 | .9954 | .9625 | 29.33 | .3106 | .001054 |
| 2.296 | 7.982 | 8641. | .9634 | .9957 | .9655 | 29.42 | .2844 | .001086 |
| 2.336 | 8.124 | 8795. | .9685 | .9963 | .9703 | 29.57 | .2659 | .001109 |
| 2.381 | 8.278 | 8967. | .9716 | .9967 | .9732 | 29.66 | .2459 | .001134 |
| 2.424 | 8.428 | 9124. | .9736 | .9969 | .9751 | 29.72 | .2267 | .001158 |
| 2.462 | 8.561 | 9268. | .9746 | .9970 | .9761 | 29.75 | .2100 | .001178 |
| 2.508 | 8.720 | 9440. | .9760 | .9972 | .9774 | 29.79 | .1903 | .001202 |
| 2.551 | 8.870 | 9602. | .9781 | .9974 | .9793 | 29.85 | .1721 | .001224 |
| 2.590 | 9.007 | 9751. | .9840 | .9981 | .9850 | 30.02 | .1558 | .001244 |
| 2.640 | 9.179 | 9937. | .9858 | .9983 | .9866 | 30.07 | .1358 | .001267 |
| 2.693 | 9.329 | 10100. | .9864 | .9984 | .9872 | 30.09 | .1189 | .001288 |
| 2.724 | 9.470 | 10252. | .9874 | .9985 | .9882 | 30.12 | .1034 | .001306 |
| 2.766 | 9.616 | 10410. | .9888 | .9986 | .9894 | 30.16 | .0880 | .001324 |
| 2.805 | 9.753 | 10558. | .9894 | .9987 | .9900 | 30.18 | .0740 | .001341 |
| 2.848 | 9.903 | 10721. | .9927 | .9991 | .9932 | 30.28 | .0593 | .001358 |
| 2.891 | 10.053 | 10883. | .9944 | .9993 | .9947 | 30.32 | .0452 | .001375 |
| 2.932 | 10.195 | 11036. | .9934 | .9992 | .9938 | 30.30 | .0325 | .001390 |
| 2.978 | 10.353 | 11208. | .9963 | .9995 | .9946 | 30.38 | .0191 | .001405 |
| 3.026 | 10.521 | 11390. | .9967 | .9996 | .9969 | 30.39 | .0057 | .001421 |
| 3.070 | 10.676 | 11557. | .9993 | .9999 | .9993 | 30.47 | 0.0000 | .001428 |
| 3.120 | 10.848 | 11744. | .9983 | .9998 | .9984 | 30.44 | 0.0000 | .001428 |
| 3.163 | 10.998 | 11906. | 1.0000 | 1.0000 | 1.0000 | 30.49 | 0.0000 | .001428 |
| 3.209 | 11.157 | 12078. | .9996 | .9999 | .9997 | 30.48 | 0.0000 | .001428 |
| 3.267 | 11.343 | 12279. | 1.0000 | 1.0000 | 1.0000 | 30.49 | 0.0000 | .001428 |
| 3.310 | 11.510 | 12461. | 1.0013 | 1.0001 | 1.0017 | 30.53 | 0.0000 | .001428 |
| 3.359 | 11.678 | 12642. | 1.0006 | 1.0000 | 1.0006 | 30.51 | 0.0000 | .001428 |
| 3.397 | 11.811 | 12786. | .9993 | .9999 | .9993 | 30.47 | 0.0000 | .001428 |
| 3.441 | 11.965 | 12953. | 1.0013 | 1.0001 | 1.0012 | 30.53 | 0.0000 | .001428 |
| 3.486 | 12.120 | 13120. | 1.0009 | 1.0001 | 1.0009 | 30.52 | 0.0000 | .001428 |
| 3.542 | 12.314 | 13331. | .9996 | .9999 | .9996 | 30.48 | 0.0000 | .001428 |
| 3.586 | 12.468 | 13498. | 1.0009 | 1.0001 | 1.0009 | 30.52 | 0.0000 | .001428 |
| 3.628 | 12.614 | 13656. | .9996 | .9999 | .9996 | 30.48 | 0.0000 | .001428 |
| 3.667 | 12.751 | 13804. | 1.0009 | 1.0001 | 1.0009 | 30.52 | 0.0000 | .001428 |
| 3.712 | 12.906 | 13971. | .9986 | .9998 | .9987 | 30.45 | 0.0000 | .001428 |

TABLE A 6. (CONT.)
PROFILE - JPL-5 - - - PITOT PRESSURE DATA

EDGE MACH NO.= .5935 TOTAL PRESSURE= .1266E+06 N/M**2
X= 7.62 CM TOTAL TEMPERATURE= 324.42 DEG-K

UE= 207.38 M/SEC DELTA STAR= .4218 CM THETA= .3003 CM H= 1.404
RE-DELTA-STAR= 53260. RE-THETA= 37930. NUWALL= .1832 CM**2/SEC

LEAST SQUARE FIT PARAMETERS
UTAU= 6.8286 M/SEC CF= .002041 PI= .5760 DELTA= 3.1613 CM
CHISQR= .2270E-04 YMAX= 2.989 CM YMIN= .053 CM

| Y (CM) | Y/THETA | Y-PLUS | M/ME | RHO/RHOF | U/UF | U-PLUS | TAU/TAU-MAX | V/U |
|--------|---------|--------|--------|----------|--------|--------|-------------|----------|
| 0.000 | 0.000 | 0. | 0.0000 | .9412 | 0.0000 | 0.00 | 1.0000 | 0.000000 |
| .010 | .033 | 37. | .4349 | .9524 | .4456 | 13.56 | 1.0000 | 0.000000 |
| .013 | .046 | 52. | .4752 | .9545 | .4864 | 14.80 | .9997 | .000001 |
| .029 | .097 | 108. | .5596 | .9596 | .5712 | 17.40 | .9987 | .000005 |
| .053 | .177 | 198. | .5970 | .9627 | .6086 | 18.55 | .9968 | .000012 |
| .078 | .267 | 293. | .6232 | .9641 | .6347 | 19.35 | .9945 | .000019 |
| .107 | .359 | 407. | .6443 | .9656 | .6557 | 19.99 | .9916 | .000027 |
| .129 | .431 | 482. | .6537 | .9663 | .6645 | 20.26 | .9893 | .000033 |
| .153 | .511 | 572. | .6707 | .9677 | .6818 | 20.80 | .9866 | .000040 |
| .187 | .625 | 700. | .6802 | .9684 | .6912 | 21.09 | .9826 | .000049 |
| .223 | .744 | 833. | .6937 | .9695 | .7045 | 21.50 | .9782 | .000060 |
| .246 | .820 | 918. | .7054 | .9705 | .7161 | 21.85 | .9757 | .000066 |
| .274 | .913 | 1022. | .7110 | .9709 | .7216 | 22.02 | .9715 | .000074 |
| .306 | 1.018 | 1140. | .7209 | .9718 | .7312 | 22.37 | .9671 | .000084 |
| .332 | 1.107 | 1240. | .7265 | .9722 | .7368 | 22.49 | .9633 | .000092 |
| .360 | 1.200 | 1344. | .7243 | .9720 | .7344 | 22.43 | .9592 | .000100 |
| .382 | 1.277 | 1424. | .7378 | .9732 | .7479 | 22.94 | .9559 | .000107 |
| .414 | 1.378 | 1543. | .7426 | .9736 | .7526 | 22.98 | .9510 | .000117 |
| .449 | 1.496 | 1675. | .7450 | .9738 | .7549 | 23.05 | .9452 | .000128 |
| .482 | 1.606 | 1798. | .7548 | .9747 | .7646 | 23.35 | .9397 | .000138 |
| .513 | 1.708 | 1912. | .7613 | .9753 | .7709 | 23.55 | .9345 | .000148 |
| .546 | 1.818 | 2035. | .7618 | .9753 | .7714 | 23.56 | .9286 | .000159 |
| .572 | 1.906 | 2134. | .7711 | .9762 | .7804 | 23.84 | .9237 | .000168 |
| .599 | 1.995 | 2234. | .7750 | .9765 | .7843 | 23.96 | .9187 | .000177 |
| .632 | 2.105 | 2357. | .7800 | .9770 | .7891 | 24.11 | .9123 | .000189 |
| .670 | 2.262 | 2532. | .7881 | .9777 | .7971 | 24.36 | .9029 | .000206 |
| .728 | 2.476 | 2717. | .7917 | .9780 | .8005 | 24.46 | .8925 | .000224 |
| .773 | 2.574 | 2882. | .8032 | .9791 | .8117 | 24.81 | .8828 | .000240 |
| .816 | 2.718 | 3043. | .8047 | .9793 | .8132 | 24.86 | .8779 | .000257 |
| .853 | 2.841 | 3181. | .8135 | .9801 | .8217 | 25.12 | .8642 | .000272 |
| .899 | 2.993 | 3351. | .8211 | .9808 | .8291 | 25.35 | .8530 | .000290 |
| .937 | 3.120 | 3493. | .8210 | .9808 | .8289 | 25.34 | .8434 | .000306 |
| .988 | 3.289 | 3682. | .8224 | .9810 | .8304 | 25.39 | .8300 | .000328 |
| 1.028 | 3.424 | 3834. | .8370 | .9824 | .8444 | 25.82 | .8189 | .000345 |
| 1.068 | 3.555 | 3981. | .8411 | .9828 | .8484 | 25.95 | .8078 | .000363 |
| 1.113 | 3.708 | 4151. | .8433 | .9830 | .8506 | 26.01 | .7945 | .000384 |
| 1.160 | 3.864 | 4326. | .8476 | .9834 | .8547 | 26.14 | .7803 | .000406 |
| 1.195 | 3.978 | 4454. | .8518 | .9838 | .8588 | 26.27 | .7696 | .000422 |
| 1.248 | 4.156 | 4653. | .8551 | .9842 | .8619 | 26.37 | .7526 | .000448 |
| 1.289 | 4.291 | 4804. | .8637 | .9850 | .8702 | 26.67 | .7397 | .000468 |
| 1.333 | 4.439 | 4970. | .8696 | .9856 | .8759 | 26.80 | .7241 | .000490 |

| Y (CM) | Y/THETA | Y-PLUS | TABLE A 6. (CONT.) | | U/U _E | U-PLUS | TAU/TAU-MAX | V/U |
|--------|---------|--------|--------------------|----------------------|------------------|--------|-------------|---------|
| | | | M/ME | RHO/RHO _E | | | | |
| 1.375 | 4.579 | 5126. | .8719 | .9859 | .8781 | 26.87 | .7095 | .000511 |
| 1.424 | 4.743 | 5311. | .8774 | .9864 | .8834 | 27.03 | .6918 | .000537 |
| 1.488 | 4.955 | 5548. | .8855 | .9873 | .8911 | 27.27 | .6683 | .000571 |
| 1.537 | 5.120 | 5737. | .8901 | .9878 | .8956 | 27.41 | .6495 | .000598 |
| 1.592 | 5.307 | 5936. | .8954 | .9883 | .9007 | 27.57 | .6282 | .000627 |
| 1.634 | 5.441 | 6092. | .8999 | .9888 | .9050 | 27.71 | .6115 | .000651 |
| 1.690 | 5.627 | 6300. | .9022 | .9890 | .9071 | 27.77 | .5889 | .000682 |
| 1.738 | 5.788 | 6480. | .9089 | .9897 | .9136 | 27.97 | .5689 | .000709 |
| 1.786 | 5.948 | 6660. | .9163 | .9905 | .9206 | 28.19 | .5485 | .000737 |
| 1.838 | 6.127 | 6854. | .9148 | .9904 | .9192 | 28.15 | .5259 | .000767 |
| 1.893 | 6.270 | 7070. | .9207 | .9910 | .9248 | 28.32 | .5070 | .000792 |
| 1.935 | 6.443 | 7214. | .9287 | .9919 | .9324 | 28.56 | .4842 | .000822 |
| 1.976 | 6.578 | 7365. | .9333 | .9924 | .9368 | 28.70 | .4662 | .000846 |
| 2.016 | 6.714 | 7517. | .9348 | .9925 | .9383 | 28.74 | .4482 | .000869 |
| 2.067 | 6.883 | 7706. | .9380 | .9929 | .9413 | 28.84 | .4254 | .000898 |
| 2.128 | 7.086 | 7933. | .9457 | .9938 | .9486 | 29.07 | .3979 | .000933 |
| 2.169 | 7.271 | 8085. | .9510 | .9943 | .9536 | 29.22 | .3798 | .000956 |
| 2.214 | 7.373 | 8255. | .9524 | .9945 | .9550 | 29.27 | .3592 | .000982 |
| 2.250 | 7.492 | 8388. | .9548 | .9948 | .9573 | 29.34 | .3433 | .001002 |
| 2.301 | 7.641 | 8577. | .9604 | .9954 | .9676 | 29.50 | .3205 | .001031 |
| 2.339 | 7.788 | 8719. | .9621 | .9956 | .9642 | 29.55 | .3031 | .001052 |
| 2.386 | 7.944 | 8894. | .9631 | .9957 | .9652 | 29.58 | .2827 | .001077 |
| 2.433 | 8.101 | 9070. | .9686 | .9963 | .9704 | 29.75 | .2621 | .001102 |
| 2.481 | 8.261 | 9249. | .9741 | .9970 | .9756 | 29.91 | .2413 | .001128 |
| 2.526 | 8.409 | 9415. | .9748 | .9970 | .9762 | 29.93 | .2223 | .001151 |
| 2.570 | 8.557 | 9581. | .9772 | .9973 | .9785 | 30.00 | .2036 | .001173 |
| 2.614 | 8.705 | 9746. | .9789 | .9975 | .9801 | 30.05 | .1853 | .001195 |
| 2.654 | 8.836 | 9893. | .9829 | .9980 | .9839 | 30.17 | .1694 | .001214 |
| 2.702 | 8.997 | 10073. | .9816 | .9978 | .9876 | 30.13 | .1503 | .001237 |
| 2.743 | 9.132 | 10275. | .9863 | .9984 | .9871 | 30.27 | .1347 | .001255 |
| 2.783 | 9.268 | 10376. | .9872 | .9985 | .9880 | 30.29 | .1195 | .001273 |
| 2.827 | 9.411 | 10537. | .9886 | .9986 | .9892 | 30.33 | .1038 | .001292 |
| 2.865 | 9.538 | 10679. | .9903 | .9988 | .9908 | 30.38 | .0904 | .001307 |
| 2.909 | 9.686 | 10845. | .9916 | .9990 | .9921 | 30.42 | .0753 | .001325 |
| 2.947 | 9.813 | 10987. | .9909 | .9989 | .9915 | 30.40 | .0629 | .001339 |
| 2.989 | 9.952 | 11143. | .9923 | .9991 | .9927 | 30.44 | .0498 | .001355 |
| 3.027 | 10.079 | 11285. | .9929 | .9991 | .9933 | 30.46 | .0384 | .001368 |
| 3.078 | 10.248 | 11474. | .9946 | .9993 | .9949 | 30.51 | .0239 | .001385 |
| 3.115 | 10.371 | 11612. | .9969 | .9996 | .9971 | 30.58 | .0143 | .001396 |
| 3.149 | 10.485 | 11739. | .9969 | .9996 | .9971 | 30.58 | .0057 | .001405 |
| 3.192 | 10.629 | 11900. | .9982 | .9997 | .9983 | 30.62 | 0.0000 | .001412 |
| 3.233 | 10.764 | 12057. | .9982 | .9997 | .9983 | 30.62 | 0.0000 | .001412 |
| 3.276 | 10.908 | 12213. | .9986 | .9998 | .9986 | 30.63 | 0.0000 | .001412 |
| 3.314 | 11.035 | 12355. | .9982 | .9997 | .9983 | 30.62 | 0.0000 | .001412 |
| 3.352 | 11.162 | 12497. | 1.0002 | 1.0000 | 1.0002 | 30.68 | 0.0000 | .001412 |
| 3.398 | 11.314 | 12667. | .9992 | .9999 | .9993 | 30.65 | 0.0000 | .001412 |
| 3.431 | 11.424 | 12790. | .9999 | .9999 | .9999 | 30.67 | 0.0000 | .001412 |
| 3.467 | 11.542 | 12923. | .9986 | .9998 | .9987 | 30.63 | 0.0000 | .001412 |
| 3.497 | 11.644 | 13036. | .9989 | .9998 | .9990 | 30.64 | 0.0000 | .001412 |
| 3.533 | 11.767 | 13169. | 1.0009 | 1.0001 | 1.0008 | 30.70 | 0.0000 | .001412 |
| 3.566 | 11.872 | 13292. | .9995 | .9999 | .9996 | 30.66 | 0.0000 | .001412 |
| 3.596 | 11.974 | 13406. | .9982 | .9997 | .9983 | 30.62 | 0.0000 | .001412 |
| 3.627 | 12.075 | 13519. | 1.0002 | 1.0000 | 1.0002 | 30.68 | 0.0000 | .001412 |
| 3.698 | 12.312 | 13784. | 1.0009 | 1.0001 | 1.0008 | 30.70 | 0.0000 | .001412 |

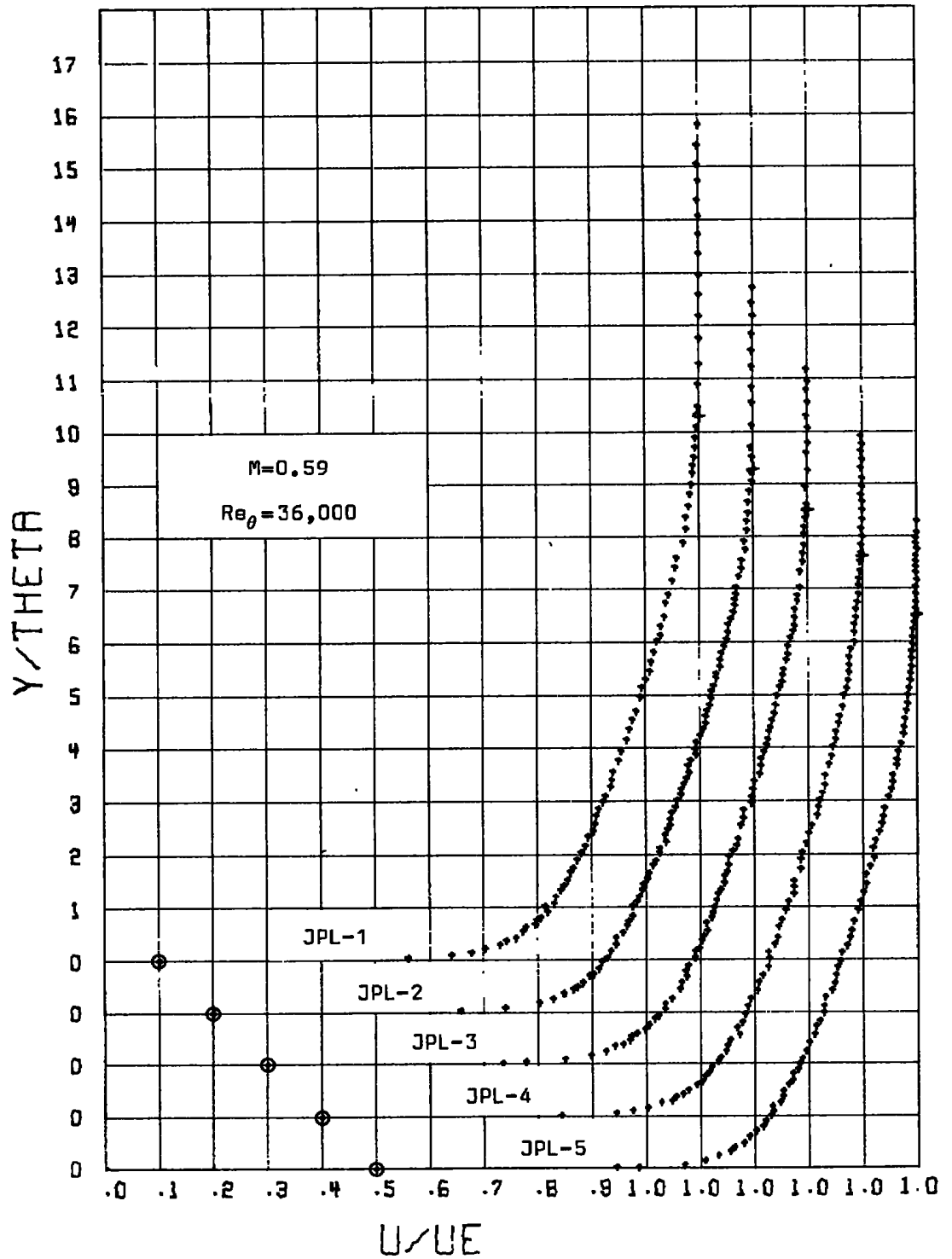


Figure A9. Mean Velocity Profiles.

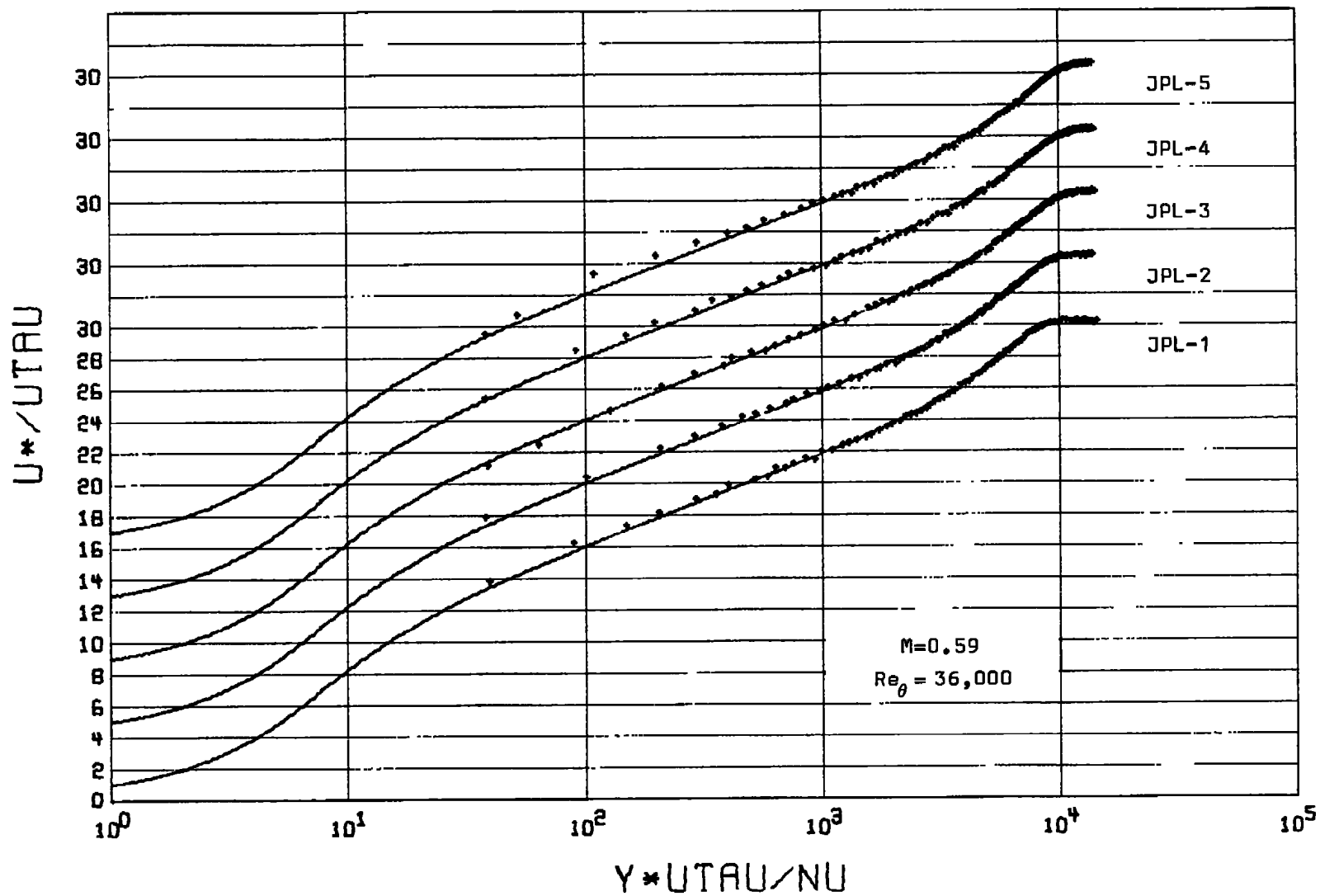


Figure A10. Van Driest Scaled Mean Velocity Profiles.

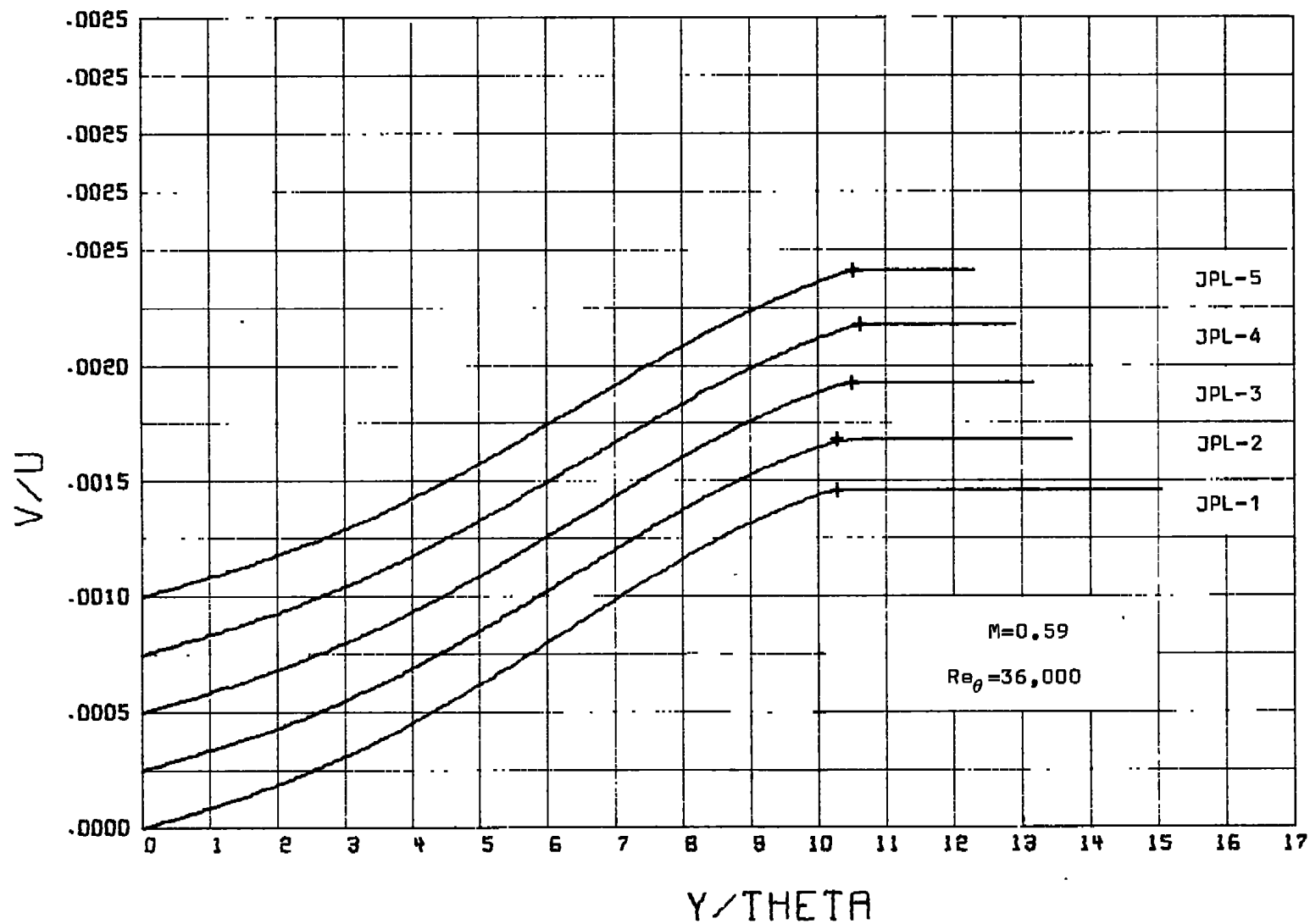


Figure A11. Normal Velocity Distribution.

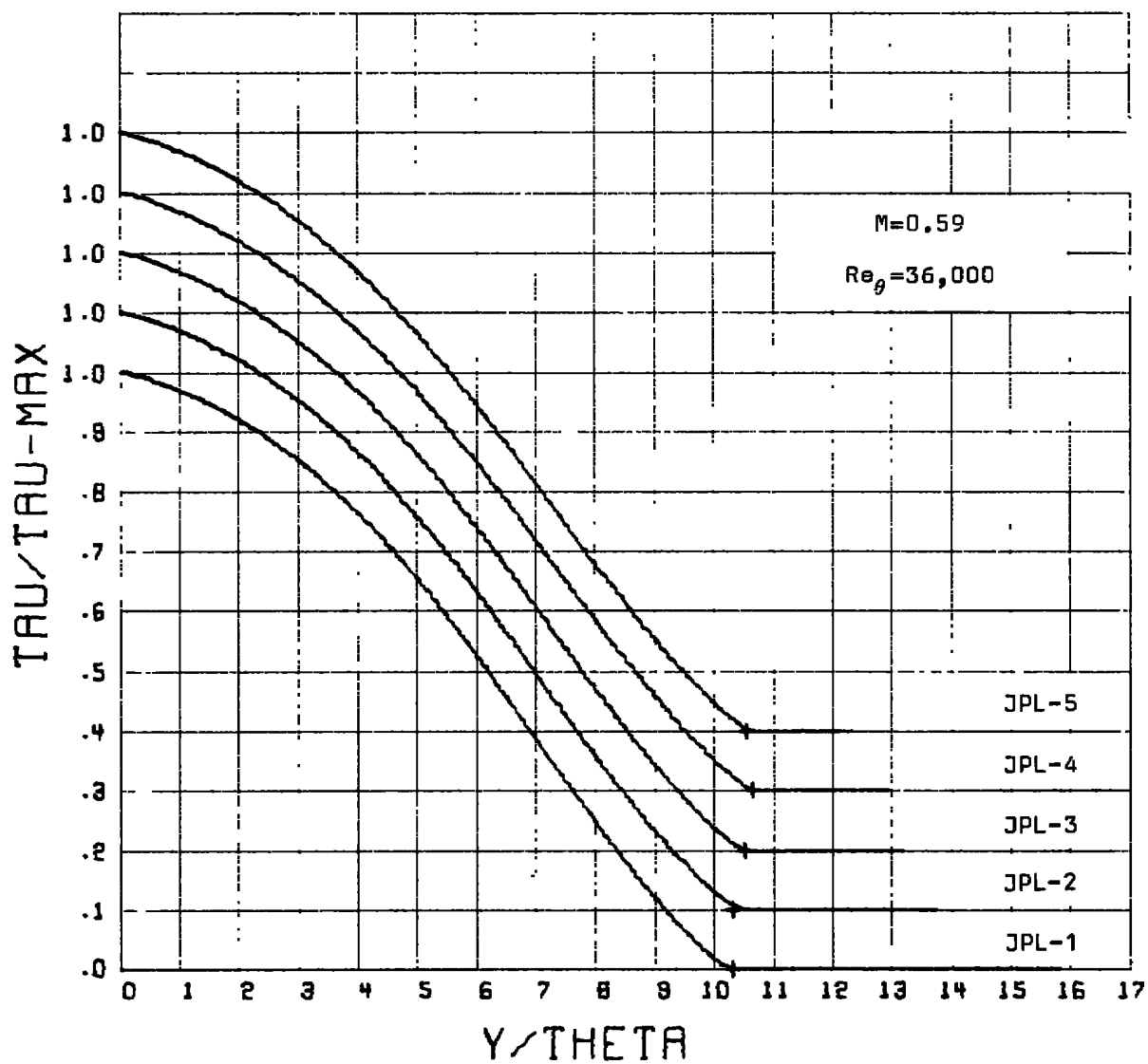


Figure A12. Shear Stress Distribution.

TABLE A 7. DATA SUMMARY
PROFILE - JPL-1 - - - PITOT PRESSURE DATA

EDGE MACH NO.= .7958
X=-48.43 CM

TOTAL PRESSURE= .6571E+05 N/M**2
TOTAL TEMPERATURE= 308.89 DEG-K

UE= 264.47 M/SEC
RE-DELTA-STAR= 30900.

DELTA STAR= .3655 CM
RE-THETA= 19770.

THETA= .2338 CM
NUWALL= .3830 CM**2/SEC

H= 1.562

LEAST SQUARE FIT PARAMETERS

UTAU= 9.1159 M/SEC
CHISQR= .4937E-05

CF= .002136
YMAX= 2.188 CM

PI= .7721
YMIN= .073 CM

DELTA= 2.3057 CM

| Y (CM) | Y/THETA | Y-PLUS | H/ME | RHO/RHDE | U/UE | U-PLUS | TAU/TAU-MAX | V/U |
|--------|---------|--------|--------|----------|--------|--------|-------------|----------|
| 0.000 | 0.000 | 0. | 0.0000 | .8991 | 0.0000 | 0.00 | 1.0000 | 0.000000 |
| .010 | .043 | 24. | .3800 | .9137 | .3975 | 11.56 | 1.0000 | 0.000000 |
| .012 | .054 | 30. | .4132 | .9164 | .4316 | 12.56 | .9998 | .000001 |
| .024 | .103 | 57. | .4635 | .9208 | .4830 | 14.07 | .9989 | .000005 |
| .038 | .162 | 90. | .5204 | .9264 | .5406 | 15.76 | .9977 | .000011 |
| .044 | .190 | 105. | .5382 | .9283 | .5586 | 16.29 | .9971 | .000014 |
| .062 | .266 | 148. | .5651 | .9313 | .5856 | 17.08 | .9952 | .000021 |
| .073 | .314 | 175. | .5852 | .9337 | .6056 | 17.68 | .9939 | .000025 |
| .093 | .401 | 223. | .6054 | .9361 | .6257 | 18.27 | .9915 | .000033 |
| .124 | .532 | 296. | .6297 | .9391 | .6498 | 18.99 | .9875 | .000045 |
| .153 | .657 | 365. | .6450 | .9411 | .6649 | 19.43 | .9834 | .000057 |
| .176 | .754 | 420. | .6579 | .9428 | .6776 | 19.81 | .9800 | .000067 |
| .196 | .841 | 468. | .6710 | .9445 | .6904 | 20.19 | .9768 | .000075 |
| .240 | 1.026 | 571. | .6838 | .9463 | .7029 | 20.56 | .9696 | .000094 |
| .280 | 1.200 | 668. | .6992 | .9484 | .7180 | 21.01 | .9624 | .000112 |
| .311 | 1.330 | 740. | .7075 | .9496 | .7260 | 21.25 | .9566 | .000126 |
| .340 | 1.455 | 810. | .7182 | .9511 | .7364 | 21.56 | .9507 | .000139 |
| .394 | 1.688 | 940. | .7299 | .9529 | .7478 | 21.90 | .9390 | .000166 |
| .436 | 1.868 | 1039. | .7439 | .9549 | .7612 | 22.30 | .9293 | .000187 |
| .478 | 2.047 | 1139. | .7483 | .9556 | .7655 | 22.43 | .9190 | .000209 |
| .534 | 2.286 | 1272. | .7614 | .9576 | .7780 | 22.81 | .9041 | .000241 |
| .575 | 2.459 | 1369. | .7722 | .9593 | .7885 | 23.12 | .8926 | .000264 |
| .618 | 2.644 | 1472. | .7834 | .9610 | .7991 | 23.44 | .8795 | .000291 |
| .661 | 2.829 | 1574. | .7893 | .9620 | .8048 | 23.61 | .8656 | .000318 |
| .706 | 3.019 | 1680. | .7956 | .9630 | .8108 | 23.79 | .8505 | .000347 |
| .756 | 3.236 | 1801. | .8048 | .9644 | .8195 | 24.05 | .8320 | .000382 |
| .806 | 3.448 | 1919. | .8152 | .9661 | .8294 | 24.35 | .8179 | .000418 |
| .859 | 3.676 | 2046. | .8274 | .9682 | .8409 | 24.69 | .7911 | .000457 |
| .913 | 3.904 | 2173. | .8307 | .9687 | .8440 | 24.79 | .7680 | .000499 |
| .961 | 4.110 | 2288. | .8455 | .9712 | .8580 | 25.21 | .7459 | .000537 |
| 1.012 | 4.328 | 2409. | .8493 | .9719 | .8615 | 25.31 | .7215 | .000579 |
| 1.073 | 4.588 | 2554. | .8620 | .9761 | .8734 | 25.67 | .6908 | .000631 |
| 1.111 | 4.751 | 2644. | .8735 | .9761 | .8841 | 26.00 | .6708 | .000664 |
| 1.162 | 4.969 | 2765. | .8803 | .9773 | .8905 | 26.19 | .6433 | .000710 |
| 1.201 | 5.137 | 2859. | .8826 | .9777 | .8926 | 26.25 | .6213 | .000745 |
| 1.235 | 5.283 | 2941. | .8883 | .9787 | .8979 | 26.41 | .6017 | .000777 |
| 1.293 | 5.490 | 3056. | .8946 | .9798 | .9038 | 26.59 | .5734 | .000821 |
| 1.336 | 5.712 | 3179. | .9036 | .9815 | .9121 | 26.84 | .5422 | .000870 |
| 1.375 | 5.881 | 3273. | .9070 | .9821 | .9153 | 26.94 | .5180 | .000907 |
| 1.431 | 6.120 | 3406. | .9183 | .9842 | .9257 | 27.25 | .4834 | .000960 |
| 1.468 | 6.277 | 3494. | .9220 | .9848 | .9290 | 27.36 | .4602 | .000994 |

| TABLE A 7. (CONT.) | | | | | | | | |
|--------------------|---------|--------|--------|----------|--------|--------|-------------|---------|
| Y (CM) | Y/THETA | Y-PLUS | M/ME | RHO/RH0E | U/UE | U-PLUS | TAU/TAU-MAX | V/U |
| 1.526 | 6.527 | 3633. | .9303 | .9864 | .9367 | 27.59 | .4231 | .001049 |
| 1.586 | 6.782 | 3775. | .9371 | .9877 | .9429 | 27.78 | .3850 | .001105 |
| 1.631 | 6.978 | 3884. | .9462 | .9894 | .9513 | 28.03 | .3558 | .001147 |
| 1.680 | 7.184 | 3999. | .9494 | .9900 | .9541 | 28.12 | .3251 | .001191 |
| 1.710 | 7.314 | 4071. | .9554 | .9912 | .9597 | 28.29 | .3058 | .001218 |
| 1.769 | 7.564 | 4210. | .9585 | .9918 | .9625 | 28.37 | .2694 | .001269 |
| 1.828 | 7.810 | 4352. | .9687 | .9938 | .9718 | 28.66 | .2330 | .001320 |
| 1.875 | 8.020 | 4464. | .9729 | .9946 | .9756 | 28.77 | .2051 | .001358 |
| 1.921 | 8.216 | 4573. | .9760 | .9952 | .9783 | 28.86 | .1788 | .001394 |
| 1.916 | 8.194 | 4561. | .9760 | .9952 | .9783 | 28.86 | .1780 | .001396 |
| 1.962 | 8.389 | 4670. | .9826 | .9965 | .9843 | 29.04 | .1561 | .001425 |
| 2.001 | 8.558 | 4763. | .9851 | .9970 | .9865 | 29.11 | .1350 | .001454 |
| 2.059 | 8.808 | 4902. | .9872 | .9974 | .9885 | 29.17 | .1048 | .001494 |
| 2.104 | 8.998 | 5008. | .9913 | .9982 | .9922 | 29.28 | .0839 | .001522 |
| 2.136 | 9.133 | 5084. | .9886 | .9977 | .9897 | 29.21 | .0695 | .001541 |
| 2.188 | 9.356 | 5208. | .9913 | .9982 | .9922 | 29.28 | .0474 | .001571 |
| 2.236 | 9.562 | 5323. | .9948 | .9989 | .9953 | 29.38 | .0289 | .001595 |
| 2.289 | 9.790 | 5450. | .9956 | .9991 | .9960 | 29.40 | .0107 | .001619 |
| 2.350 | 10.051 | 5595. | .9961 | .9992 | .9965 | 29.41 | 0.0000 | .001633 |
| 2.406 | 10.290 | 5728. | .9988 | .9997 | .9989 | 29.49 | 0.0000 | .001633 |
| 2.528 | 10.811 | 6018. | .9995 | .9999 | .9995 | 29.50 | 0.0000 | .001633 |
| 2.647 | 11.322 | 6302. | 1.0017 | 1.0003 | 1.0016 | 29.57 | 0.0000 | .001633 |
| 2.750 | 11.805 | 6571. | .9985 | .9997 | .9987 | 29.48 | 0.0000 | .001633 |
| 2.875 | 12.294 | 6843. | 1.0013 | 1.0002 | 1.0011 | 29.55 | 0.0000 | .001633 |
| 2.971 | 12.707 | 7073. | .9994 | .9998 | .9995 | 29.50 | 0.0000 | .001633 |
| 3.084 | 13.190 | 7342. | .9992 | .9998 | .9993 | 29.50 | 0.0000 | .001633 |
| 3.204 | 13.700 | 7626. | 1.0012 | 1.0002 | 1.0011 | 29.55 | 0.0000 | .001633 |
| 3.305 | 14.135 | 7868. | 1.0005 | 1.0001 | 1.0005 | 29.53 | 0.0000 | .001633 |
| 3.408 | 14.575 | 8113. | 1.0014 | 1.0002 | 1.0012 | 29.56 | 0.0000 | .001633 |
| 3.529 | 15.090 | 8400. | .9984 | .9996 | .9985 | 29.47 | 0.0000 | .001633 |
| 3.576 | 15.291 | 8512. | 1.0012 | 1.0002 | 1.0011 | 29.55 | 0.0000 | .001633 |

TABLE A 7. (CONT.)
PROFILE - JPL-2 -- - PITOT PRESSURE DATA

EDGE MACH NO.= .7882 TOTAL PRESSURE= .6691E+05 N/M**2
X=-26.21 CM TOTAL TEMPERATURE= 311.56 DEG-K

UF= 263.34 M/SFC DELTA STAR= .4124 CM THETA= .2666 CM H= 1.546
RE-DELTA-STAR= 33R00. RF-THETA= 21850. NUWALL= .3792 CM**2/SEC

LEAST SQUARE FIT PARAMETERS
UTAU= 9.0116 M/SEC CF= .002109 PI= .6917 DELTA= 2.6693 CM
CHISQR= .6624E-05 YMAX= 2.493 CM YMIN= .083 CM

| Y (CM) | Y/THETA | Y-PLUS | M/ME | RHO/RH0E | U/UE | U-PLUS | TAU/TAU-MAX | V/U |
|--------|---------|--------|--------|----------|--------|--------|-------------|----------|
| 0.000 | 0.000 | 0. | 0.0000 | .9009 | 0.0000 | 0.00 | 1.0000 | 0.000000 |
| .010 | .038 | 24. | .3854 | .9156 | .4028 | 11.80 | 1.0000 | 0.000000 |
| .017 | .066 | 42. | .4512 | .9210 | .4701 | 13.79 | .9995 | .000002 |
| .030 | .114 | 77. | .5037 | .9260 | .5234 | 15.36 | .9986 | .000007 |
| .044 | .166 | 105. | .5383 | .9296 | .5583 | 16.40 | .9975 | .000012 |
| .057 | .214 | 135. | .5583 | .9318 | .5783 | 16.99 | .9963 | .000016 |
| .083 | .314 | 199. | .5870 | .9350 | .6070 | 17.84 | .9937 | .000025 |
| .095 | .357 | 226. | .5996 | .9365 | .6196 | 18.22 | .9925 | .000029 |
| .107 | .404 | 256. | .6164 | .9385 | .6363 | 18.72 | .9911 | .000033 |
| .140 | .528 | 335. | .6322 | .9405 | .6519 | 19.18 | .9873 | .000045 |
| .163 | .614 | 389. | .6505 | .9428 | .6699 | 19.72 | .9845 | .000053 |
| .186 | .700 | 443. | .6595 | .9440 | .6787 | 19.99 | .9815 | .000061 |
| .215 | .809 | 513. | .6750 | .9460 | .6940 | 20.44 | .9775 | .000071 |
| .234 | .881 | 558. | .6815 | .9469 | .7004 | 20.63 | .9748 | .000078 |
| .260 | .976 | 618. | .6904 | .9481 | .7090 | 20.89 | .9711 | .000087 |
| .280 | 1.052 | 667. | .6918 | .9483 | .7104 | 20.93 | .9680 | .000095 |
| .316 | 1.186 | 751. | .7030 | .9498 | .7213 | 21.26 | .9674 | .000108 |
| .341 | 1.281 | 811. | .7075 | .9505 | .7256 | 21.39 | .9582 | .000118 |
| .367 | 1.376 | 872. | .7140 | .9514 | .7320 | 21.58 | .9539 | .000128 |
| .382 | 1.433 | 908. | .7218 | .9525 | .7396 | 21.81 | .9512 | .000134 |
| .426 | 1.600 | 1014. | .7270 | .9537 | .7446 | 21.96 | .9430 | .000153 |
| .466 | 1.748 | 1107. | .7346 | .9543 | .7520 | 22.18 | .9353 | .000169 |
| .504 | 1.891 | 1198. | .7504 | .9567 | .7671 | 22.64 | .9276 | .000186 |
| .544 | 2.043 | 1294. | .7581 | .9578 | .7746 | 22.86 | .9188 | .000204 |
| .582 | 2.186 | 1385. | .7677 | .9593 | .7838 | 23.14 | .9102 | .000227 |
| .615 | 2.310 | 1463. | .7672 | .9592 | .7833 | 23.13 | .9024 | .000238 |
| .659 | 2.472 | 1566. | .7727 | .9600 | .7886 | 23.29 | .8916 | .000259 |
| .697 | 2.615 | 1656. | .7798 | .9611 | .7954 | 23.49 | .8817 | .000279 |
| .735 | 2.757 | 1747. | .7887 | .9625 | .8039 | 23.75 | .8713 | .000299 |
| .759 | 2.848 | 1804. | .7944 | .9634 | .8093 | 23.91 | .8645 | .000312 |
| .797 | 2.991 | 1895. | .7988 | .9641 | .8135 | 24.04 | .8533 | .000333 |
| .839 | 3.148 | 1994. | .8078 | .9655 | .8221 | 24.30 | .8405 | .000357 |
| .863 | 3.239 | 2052. | .8114 | .9661 | .8255 | 24.40 | .8329 | .000371 |
| .904 | 3.391 | 2148. | .8162 | .9669 | .8300 | 24.54 | .8196 | .000395 |
| .933 | 3.501 | 2218. | .8202 | .9675 | .8338 | 24.65 | .8096 | .000413 |
| .960 | 3.601 | 2281. | .8246 | .9683 | .8380 | 24.78 | .8003 | .000430 |
| .986 | 3.701 | 2345. | .8291 | .9690 | .8423 | 24.91 | .7908 | .000447 |
| 1.027 | 3.853 | 2441. | .8345 | .9699 | .8473 | 25.06 | .7758 | .000473 |
| 1.093 | 4.101 | 2598. | .8450 | .9716 | .8572 | 25.36 | .7502 | .000517 |
| 1.153 | 4.325 | 2740. | .8514 | .9727 | .8632 | 25.54 | .7258 | .000558 |
| 1.198 | 4.496 | 2849. | .8593 | .9740 | .8707 | 25.77 | .7063 | .000591 |

| Y (CM) | Y/THEFT | Y-PLUS | TABLE A 7. (CONT.) | | U/UE | U-PLUS | TAU/TAU-MAX | V/U |
|--------|---------|--------|--------------------|----------|--------|--------|-------------|---------|
| | | | M/ME | RHO/RHOE | | | | |
| 1.250 | 4.691 | 2972. | .8671 | .9754 | .8779 | 25.99 | .6834 | .000628 |
| 1.311 | 4.920 | 3117. | .8802 | .9776 | .8902 | 26.36 | .6555 | .000673 |
| 1.362 | 5.111 | 3238. | .8848 | .9784 | .8945 | 26.49 | .6314 | .000717 |
| 1.418 | 5.320 | 3371. | .8922 | .9798 | .9014 | 26.70 | .6042* | .000754 |
| 1.477 | 5.539 | 3510. | .8977 | .9807 | .9065 | 26.86 | .5749 | .000800 |
| 1.530 | 5.739 | 3636. | .9063 | .9823 | .9144 | 27.10 | .5475 | .000842 |
| 1.581 | 5.930 | 3757. | .9106 | .9830 | .9184 | 27.22 | .5209 | .000882 |
| 1.644 | 6.168 | 3908. | .9193 | .9846 | .9264 | 27.47 | .4871 | .000937 |
| 1.703 | 6.387 | 4047. | .9236 | .9854 | .9304 | 27.59 | .4555 | .000979 |
| 1.752 | 6.573 | 4165. | .9330 | .9871 | .9390 | 27.85 | .4284 | .001018 |
| 1.804 | 6.768 | 4288. | .9369 | .9878 | .9426 | 27.96 | .3999 | .001059 |
| 1.857 | 6.949 | 4403. | .9475 | .9889 | .9478 | 28.12 | .3734 | .001097 |
| 1.901 | 7.130 | 4518. | .9499 | .9903 | .9545 | 28.33 | .3469 | .001135 |
| 1.950 | 7.316 | 4635. | .9540 | .9910 | .9582 | 28.44 | .3199 | .001173 |
| 2.021 | 7.583 | 4804. | .9592 | .9920 | .9630 | 28.59 | .2815 | .001226 |
| 2.077 | 7.792 | 4937. | .9638 | .9929 | .9677 | 28.77 | .2518 | .001267 |
| 2.142 | 8.035 | 5091. | .9712 | .9943 | .9739 | 28.92 | .2182 | .001312 |
| 2.197 | 8.240 | 5221. | .9731 | .9947 | .9757 | 28.98 | .1907 | .001349 |
| 2.249 | 8.435 | 5345. | .9779 | .9956 | .9800 | 29.11 | .1652 | .001384 |
| 2.305 | 8.645 | 5477. | .9821 | .9964 | .9838 | 29.23 | .1390 | .001418 |
| 2.366 | 8.874 | 5622. | .9860 | .9972 | .9873 | 29.34 | .1117 | .001455 |
| 2.426 | 9.107 | 5767. | .9885 | .9977 | .9896 | 29.40 | .0860 | .001488 |
| 2.493 | 9.350 | 5924. | .9909 | .9982 | .9918 | 29.47 | .0603 | .001522 |
| 2.540 | 9.526 | 6036. | .9923 | .9984 | .9931 | 29.51 | .0434 | .001544 |
| 2.594 | 9.731 | 6166. | .9950 | .9990 | .9955 | 29.59 | .0253 | .001567 |
| 2.655 | 9.960 | 6310. | .9941 | .9988 | .9947 | 29.56 | .0073 | .001591 |
| 2.703 | 10.141 | 6425. | .9983 | .9996 | .9985 | 29.68 | 0.0000 | .001600 |
| 2.757 | 10.341 | 6552. | .9983 | .9996 | .9985 | 29.68 | 0.0000 | .001600 |
| 2.867 | 10.755 | 6814. | .9973 | .9994 | .9976 | 29.65 | 0.0000 | .001600 |
| 2.954 | 11.079 | 7020. | .9976 | .9995 | .9979 | 29.66 | 0.0000 | .001600 |
| 3.046 | 11.477 | 7240. | .9999 | .9999 | .9999 | 29.72 | 0.0000 | .001600 |
| 3.116 | 11.689 | 7406. | .9994 | .9998 | .9995 | 29.71 | 0.0000 | .001600 |
| 3.190 | 11.965 | 7581. | 1.0021 | 1.0004 | 1.0019 | 29.78 | 0.0000 | .001600 |
| 3.241 | 12.156 | 7702. | 1.0003 | 1.0000 | 1.0003 | 29.73 | 0.0000 | .001600 |
| 3.285 | 12.322 | 7807. | .9975 | .9995 | .9977 | 29.65 | 0.0000 | .001600 |
| 3.324 | 12.470 | 7901. | 1.0010 | 1.0007 | 1.0009 | 29.75 | 0.0000 | .001600 |
| 3.364 | 12.618 | 7995. | 1.0015 | 1.0003 | 1.0014 | 29.77 | 0.0000 | .001600 |
| 3.407 | 12.780 | 8097. | 1.0000 | 1.0000 | 1.0000 | 29.73 | 0.0000 | .001600 |
| 3.451 | 12.946 | 8203. | .9980 | .9994 | .9987 | 29.67 | 0.0000 | .001600 |

TABLE A 7. (CONT.)
PROFILE - JPL-3 -- - PITOT PRESSURE DATA

EDGE MACH NO. = .8049 TOTAL PRESSURE = .6691F+05 N/M**2
X = -7.62 CM TOTAL TEMPERATURE = 306.95 DEG-K

UE = 266.29 M/SEC DELTA STAR = .4221 CM THETA = .2748 CM H = 1.535
RE-DELTA-STAR = 36160. RE-THETA = 23540. NUWALL = .3737 CM**2/SEC

LEAST SQUARE FIT PARAMETERS
UTAH = 9.1807 M/SEC CF = .002132 PI = .5994 DELTA = 2.8609 CM
CHISQR = .1455E-04 YMAX = 2.719 CM YMIN = .080 CM

| Y (CM) | Y/THETA | Y-PLUS | M/ME | RHO/RHOE | U/UE | II-PLUS | TAU/TAU-MAX | V/U |
|--------|---------|--------|--------|----------|--------|---------|-------------|----------|
| 0.000 | 0.000 | 0. | 0.0000 | .8971 | 0.0000 | 0.00 | 1.0000 | 0.000000 |
| .010 | .036 | 24. | .4203 | .9152 | .4393 | 12.78 | 1.0000 | 0.000000 |
| .017 | .064 | 43. | .4848 | .9212 | .5051 | 14.71 | .9995 | .000002 |
| .025 | .092 | 62. | .5226 | .9252 | .5433 | 15.84 | .9990 | .000005 |
| .039 | .143 | 96. | .5523 | .9285 | .5732 | 16.72 | .9979 | .000010 |
| .044 | .161 | 109. | .5670 | .9301 | .5879 | 17.15 | .9974 | .000012 |
| .080 | .291 | 196. | .6046 | .9347 | .6253 | 18.26 | .9941 | .000024 |
| .107 | .374 | 252. | .6258 | .9374 | .6463 | 18.88 | .9917 | .000031 |
| .120 | .438 | 296. | .6361 | .9387 | .6565 | 19.18 | .9897 | .000037 |
| .132 | .480 | 324. | .6447 | .9398 | .6650 | 19.44 | .9883 | .000041 |
| .157 | .572 | 386. | .6527 | .9409 | .6729 | 19.67 | .9853 | .000050 |
| .176 | .642 | 433. | .6652 | .9426 | .6852 | 20.03 | .9828 | .000057 |
| .207 | .753 | 508. | .6752 | .9440 | .6950 | 20.33 | .9788 | .000067 |
| .233 | .850 | 574. | .6855 | .9454 | .7050 | 20.62 | .9751 | .000077 |
| .264 | .961 | 648. | .6942 | .9467 | .7135 | 20.88 | .9707 | .000088 |
| .297 | 1.062 | 717. | .7020 | .9478 | .7210 | 21.10 | .9665 | .000098 |
| .326 | 1.187 | 801. | .7092 | .9488 | .7280 | 21.31 | .9612 | .000111 |
| .354 | 1.289 | 870. | .7175 | .9500 | .7362 | 21.55 | .9566 | .000121 |
| .387 | 1.409 | 951. | .7282 | .9516 | .7465 | 21.86 | .9510 | .000134 |
| .408 | 1.487 | 1004. | .7347 | .9526 | .7527 | 22.05 | .9473 | .000143 |
| .441 | 1.608 | 1085. | .7383 | .9532 | .7562 | 22.15 | .9413 | .000156 |
| .473 | 1.723 | 1163. | .7467 | .9544 | .7643 | 22.39 | .9354 | .000169 |
| .511 | 1.862 | 1257. | .7510 | .9551 | .7684 | 22.52 | .9279 | .000185 |
| .546 | 1.986 | 1341. | .7591 | .9564 | .7762 | 22.75 | .9210 | .000199 |
| .571 | 2.079 | 1404. | .7630 | .9570 | .7799 | 22.86 | .9156 | .000210 |
| .612 | 2.227 | 1503. | .7691 | .9579 | .7858 | 23.04 | .9068 | .000228 |
| .646 | 2.351 | 1588. | .7743 | .9588 | .7907 | 23.19 | .8990 | .000244 |
| .683 | 2.485 | 1678. | .7840 | .9603 | .8000 | 23.46 | .8903 | .000261 |
| .715 | 2.601 | 1756. | .7847 | .9604 | .8007 | 23.49 | .8825 | .000276 |
| .750 | 2.730 | 1843. | .7942 | .9620 | .8098 | 23.76 | .8736 | .000294 |
| .789 | 2.874 | 1940. | .7978 | .9626 | .8132 | 23.86 | .8632 | .000314 |
| .828 | 3.012 | 2034. | .8029 | .9634 | .8180 | 24.00 | .8528 | .000333 |
| .873 | 3.179 | 2146. | .8143 | .9653 | .8288 | 24.33 | .8398 | .000358 |
| .910 | 3.313 | 2237. | .8156 | .9655 | .8300 | 24.37 | .8289 | .000378 |
| .952 | 3.465 | 2340. | .8208 | .9664 | .8349 | 24.51 | .8161 | .000401 |
| .996 | 3.627 | 2449. | .8266 | .9674 | .8405 | 24.68 | .8019 | .000426 |
| 1.029 | 3.747 | 2530. | .8324 | .9684 | .8459 | 24.84 | .7911 | .000446 |
| 1.078 | 3.927 | 2648. | .8399 | .9696 | .8529 | 25.05 | .7746 | .000475 |
| 1.113 | 4.052 | 2736. | .8462 | .9707 | .8588 | 25.23 | .7621 | .000496 |
| 1.144 | 4.163 | 2811. | .8485 | .9711 | .8610 | 25.30 | .7511 | .000515 |
| 1.181 | 4.297 | 2901. | .8554 | .9724 | .8675 | 25.49 | .7374 | .000539 |

| Y (CM) | Y/THETA | Y-PLUS | TABLE A 7. (CONT.) M/ME | RHO/RHOF | U/UF | U-PLUS | TAU/TAU-MAX | V/U |
|--------|---------|--------|----------------------------|----------|--------|--------|-------------|---------|
| 1.773 | 4.449 | 3004. | .8593 | .9730 | .8711 | 25.61 | .7215 | .000566 |
| 1.761 | 4.588 | 3098. | .8638 | .9738 | .8753 | 25.73 | .7066 | .000591 |
| 1.796 | 4.717 | 3185. | .8695 | .9749 | .8806 | 25.89 | .6923 | .000614 |
| 1.347 | 4.844 | 3297. | .8753 | .9759 | .8860 | 26.06 | .6735 | .000645 |
| 1.379 | 5.018 | 3388. | .8797 | .9767 | .8901 | 26.18 | .6579 | .000670 |
| 1.414 | 5.147 | 3475. | .8822 | .9771 | .8925 | 26.25 | .6426 | .000695 |
| 1.457 | 5.286 | 3569. | .8860 | .9778 | .8959 | 26.36 | .6259 | .000722 |
| 1.502 | 5.464 | 3691. | .8940 | .9793 | .9033 | 26.58 | .6037 | .000757 |
| 1.535 | 5.586 | 3772. | .8970 | .9799 | .9062 | 26.67 | .5886 | .000781 |
| 1.574 | 5.729 | 3868. | .9013 | .9806 | .9101 | 26.79 | .5703 | .000809 |
| 1.630 | 5.932 | 4006. | .9091 | .9821 | .9173 | 27.00 | .5439 | .000850 |
| 1.677 | 6.085 | 4109. | .9130 | .9828 | .9209 | 27.11 | .5238 | .000881 |
| 1.703 | 6.196 | 4183. | .9180 | .9838 | .9255 | 27.25 | .5090 | .000903 |
| 1.746 | 6.353 | 4290. | .9212 | .9844 | .9285 | 27.34 | .4878 | .000935 |
| 1.784 | 6.492 | 4383. | .9259 | .9853 | .9328 | 27.47 | .4690 | .000963 |
| 1.821 | 6.624 | 4474. | .9305 | .9862 | .9370 | 27.60 | .4506 | .000990 |
| 1.865 | 6.787 | 4583. | .9345 | .9869 | .9407 | 27.71 | .4283 | .001023 |
| 1.917 | 6.958 | 4698. | .9368 | .9874 | .9428 | 27.78 | .4045 | .001058 |
| 1.955 | 7.115 | 4804. | .9420 | .9884 | .9475 | 27.92 | .3878 | .001089 |
| 2.009 | 7.309 | 4935. | .9487 | .9897 | .9536 | 28.11 | .3559 | .001128 |
| 2.053 | 7.471 | 5045. | .9529 | .9905 | .9574 | 28.22 | .3335 | .001160 |
| 2.104 | 7.656 | 5169. | .9557 | .9910 | .9600 | 28.30 | .3080 | .001196 |
| 2.159 | 7.855 | 5304. | .9626 | .9924 | .9662 | 28.49 | .2808 | .001235 |
| 2.208 | 8.035 | 5425. | .9653 | .9929 | .9687 | 28.57 | .2565 | .001269 |
| 2.272 | 8.266 | 5581. | .9699 | .9939 | .9729 | 28.70 | .2258 | .001311 |
| 2.325 | 8.460 | 5712. | .9756 | .9950 | .9780 | 28.85 | .2006 | .001346 |
| 2.376 | 8.645 | 5837. | .9780 | .9955 | .9802 | 28.92 | .1771 | .001378 |
| 2.433 | 8.853 | 5977. | .9804 | .9960 | .9824 | 28.98 | .1515 | .001413 |
| 2.493 | 9.070 | 6124. | .9849 | .9969 | .9864 | 29.11 | .1258 | .001447 |
| 2.550 | 9.278 | 6265. | .9889 | .9977 | .9900 | 29.27 | .1022 | .001479 |
| 2.608 | 9.490 | 6408. | .9894 | .9978 | .9905 | 29.23 | .0793 | .001510 |
| 2.667 | 9.703 | 6552. | .9928 | .9985 | .9935 | 29.33 | .0577 | .001538 |
| 2.719 | 9.892 | 6679. | .9943 | .9988 | .9949 | 29.37 | .0397 | .001562 |
| 2.780 | 10.114 | 6829. | .9954 | .9990 | .9959 | 29.40 | .0202 | .001588 |
| 2.823 | 10.271 | 6935. | .9972 | .9994 | .9975 | 29.45 | .0075 | .001605 |
| 2.877 | 10.470 | 7070. | .9975 | .9994 | .9977 | 29.46 | 0.0000 | .001615 |
| 2.937 | 10.669 | 7204. | .9985 | .9997 | .9987 | 29.48 | 0.0000 | .001615 |
| 2.993 | 10.890 | 7353. | .9990 | .9998 | .9991 | 29.50 | 0.0000 | .001615 |
| 3.051 | 11.103 | 7497. | .9990 | .9998 | .9991 | 29.50 | 0.0000 | .001615 |
| 3.097 | 11.269 | 7609. | 1.0001 | 1.0000 | 1.0001 | 29.53 | 0.0000 | .001615 |
| 3.150 | 11.463 | 7740. | .9956 | .9991 | .9961 | 29.40 | 0.0000 | .001615 |
| 3.194 | 11.621 | 7846. | 1.0008 | 1.0001 | 1.0007 | 29.55 | 0.0000 | .001615 |
| 3.244 | 11.805 | 7971. | .9993 | .9998 | .9994 | 29.50 | 0.0000 | .001615 |
| 3.314 | 12.060 | 8143. | 1.0001 | 1.0000 | 1.0001 | 29.53 | 0.0000 | .001615 |
| 3.369 | 12.258 | 8277. | .9989 | .9997 | .9990 | 29.49 | 0.0000 | .001615 |
| 3.449 | 12.549 | 8474. | 1.0011 | 1.0007 | 1.0010 | 29.55 | 0.0000 | .001615 |
| 3.514 | 12.785 | 8633. | 1.0001 | 1.0000 | 1.0001 | 29.53 | 0.0000 | .001615 |
| 3.561 | 12.956 | 8748. | .9972 | .9994 | .9975 | 29.45 | 0.0000 | .001615 |
| 3.591 | 13.067 | 8823. | 1.0003 | 1.0000 | 1.0003 | 29.53 | 0.0000 | .001615 |
| 3.648 | 13.275 | 8963. | 1.0011 | 1.0007 | 1.0010 | 29.55 | 0.0000 | .001615 |

TABLE A 7. (CONT.)
PROFILE - JPL-4 - - - PITOT PRESSURE DATA

EDGE MACH NO.= .8016
X= 0.00 CM

TOTAL PRESSURE= .6665E+05 N/M**2
TOTAL TEMPERATURE= 312.05 DEG-K

UE= 267.51 M/SFC
RE-DELTA-STAR= 36480.

DELTA STAR= .4395 CM
RE-THETA= 23710.

THETA= .2857 CM
NUWALL= .3845 CM**2/SFC

H= 1.538
CF= .002086

LEAST SQUARE FIT PARAMETERS

UTAU= 9.1926 M/SEC
CHISQR= .8257E-05

CF= .002120
YMAX= 2.799 CM

PI= .6145
YMIN= .071 CM

DELTA= 2.9611 CM

| Y (CM) | Y/THETA | Y-PLUS | M/ME | RHO/RHOF | U/HF | U-PLUS | TAU/TAU-MAX | V/U |
|--------|---------|--------|--------|----------|--------|--------|-------------|----------|
| 0.000 | 0.000 | 0. | 0.0000 | .8978 | 0.0000 | 0.00 | 1.0000 | 0.000000 |
| .010 | .035 | 24. | .4146 | .9154 | .4333 | 12.65 | 1.0000 | 0.000000 |
| .016 | .057 | 39. | .4571 | .9192 | .4768 | 13.92 | .9996 | .000002 |
| .034 | .120 | 81. | .5321 | .9268 | .5527 | 16.17 | .9984 | .000008 |
| .052 | .182 | 124. | .5592 | .9298 | .5799 | 16.97 | .9970 | .000013 |
| .071 | .248 | 170. | .5853 | .9328 | .6060 | 17.74 | .9953 | .000019 |
| .107 | .377 | 258. | .6187 | .9369 | .6391 | 18.73 | .9916 | .000031 |
| .128 | .448 | 306. | .6302 | .9384 | .6505 | 19.07 | .9894 | .000038 |
| .154 | .542 | 370. | .6476 | .9407 | .6677 | 19.58 | .9864 | .000047 |
| .170 | .595 | 406. | .6533 | .9414 | .6733 | 19.74 | .9846 | .000052 |
| .198 | .693 | 473. | .6673 | .9433 | .6870 | 20.15 | .9812 | .000061 |
| .234 | .822 | 561. | .6836 | .9456 | .7030 | 20.63 | .9764 | .000073 |
| .265 | .929 | 634. | .6928 | .9469 | .7120 | 20.90 | .9723 | .000084 |
| .292 | 1.022 | 698. | .7011 | .9480 | .7200 | 21.14 | .9685 | .000093 |
| .323 | 1.133 | 774. | .7092 | .9492 | .7279 | 21.38 | .9638 | .000104 |
| .356 | 1.249 | 853. | .7139 | .9499 | .7324 | 21.51 | .9588 | .000116 |
| .392 | 1.373 | 938. | .7316 | .9525 | .7496 | 22.03 | .9531 | .000129 |
| .419 | 1.466 | 1001. | .7243 | .9514 | .7425 | 21.81 | .9487 | .000139 |
| .455 | 1.595 | 1090. | .7378 | .9534 | .7556 | 22.20 | .9424 | .000153 |
| .495 | 1.733 | 1184. | .7474 | .9549 | .7648 | 22.48 | .9353 | .000168 |
| .529 | 1.853 | 1266. | .7529 | .9557 | .7701 | 22.64 | .9289 | .000182 |
| .563 | 1.973 | 1348. | .7584 | .9566 | .7754 | 22.80 | .9222 | .000195 |
| .610 | 2.138 | 1460. | .7607 | .9569 | .7776 | 22.86 | .9127 | .000215 |
| .641 | 2.244 | 1533. | .7676 | .9580 | .7842 | 23.06 | .9063 | .000228 |
| .668 | 2.338 | 1597. | .7744 | .9591 | .7908 | 23.26 | .9004 | .000240 |
| .707 | 2.475 | 1691. | .7834 | .9605 | .7994 | 23.52 | .8916 | .000257 |
| .753 | 2.635 | 1800. | .7886 | .9613 | .8043 | 23.67 | .8808 | .000278 |
| .796 | 2.787 | 1903. | .7952 | .9624 | .8106 | 23.86 | .8701 | .000299 |
| .844 | 2.955 | 2019. | .8003 | .9632 | .8154 | 24.00 | .8577 | .000322 |
| .886 | 3.102 | 2119. | .8064 | .9642 | .8212 | 24.18 | .8464 | .000344 |
| .925 | 3.240 | 2213. | .8154 | .9657 | .8297 | 24.43 | .8354 | .000364 |
| .976 | 3.418 | 2334. | .8240 | .9672 | .8379 | 24.68 | .8205 | .000391 |
| 1.009 | 3.533 | 2413. | .8257 | .9675 | .8395 | 24.73 | .8105 | .000409 |
| 1.060 | 3.711 | 2535. | .8319 | .9685 | .8453 | 24.91 | .7947 | .000437 |
| 1.103 | 3.862 | 2638. | .8391 | .9697 | .8520 | 25.11 | .7806 | .000462 |
| 1.145 | 4.009 | 2738. | .8411 | .9701 | .8539 | 25.17 | .7665 | .000486 |
| 1.176 | 4.116 | 2811. | .8458 | .9709 | .8584 | 25.30 | .7560 | .000504 |
| 1.214 | 4.249 | 2902. | .8531 | .9722 | .8652 | 25.51 | .7425 | .000527 |
| 1.258 | 4.405 | 3009. | .8574 | .9729 | .8692 | 25.63 | .7262 | .000555 |
| 1.296 | 4.538 | 3100. | .8635 | .9740 | .8749 | 25.80 | .7119 | .000579 |
| 1.336 | 4.676 | 3194. | .8688 | .9749 | .8798 | 25.95 | .6967 | .000604 |

| Y (CM) | Y/THETA | Y-PLUS | TABLE A 7. (CONT.) | | U/U _E | U-PLUS | TAU/TAU-MAX | V/U |
|--------|---------|--------|--------------------|----------|------------------|--------|-------------|---------|
| | | | M/ME | RHM/RHME | | | | |
| 1.376 | 4.818 | 3291. | .8704 | .9757 | .8813 | 26.00 | .6807 | .000630 |
| 1.410 | 4.938 | 3373. | .8771 | .9764 | .8876 | 26.18 | .6666 | .000653 |
| 1.454 | 5.089 | 3476. | .8812 | .9771 | .8914 | 26.30 | .6491 | .000681 |
| 1.492 | 5.222 | 3567. | .8856 | .9779 | .8955 | 26.42 | .6330 | .000707 |
| 1.550 | 5.427 | 3707. | .8927 | .9792 | .9021 | 26.63 | .6078 | .000746 |
| 1.596 | 5.587 | 3816. | .8989 | .9803 | .9078 | 26.80 | .5876 | .000778 |
| 1.647 | 5.765 | 3938. | .9025 | .9810 | .9112 | 26.90 | .5647 | .000813 |
| 1.692 | 5.925 | 4047. | .9116 | .9827 | .9196 | 27.16 | .5438 | .000845 |
| 1.733 | 6.067 | 4144. | .9143 | .9837 | .9220 | 27.23 | .5249 | .000874 |
| 1.779 | 6.227 | 4253. | .9161 | .9835 | .9237 | 27.28 | .5034 | .000906 |
| 1.817 | 6.360 | 4344. | .9235 | .9849 | .9305 | 27.49 | .4853 | .000933 |
| 1.860 | 6.512 | 4448. | .9276 | .9857 | .9343 | 27.60 | .4666 | .000964 |
| 1.899 | 6.649 | 4542. | .9305 | .9863 | .9370 | 27.69 | .4456 | .000992 |
| 1.936 | 6.778 | 4630. | .9369 | .9875 | .9428 | 27.87 | .4277 | .001019 |
| 1.985 | 6.947 | 4745. | .9384 | .9878 | .9442 | 27.91 | .4038 | .001053 |
| 2.021 | 7.076 | 4833. | .9403 | .9881 | .9459 | 27.96 | .3863 | .001079 |
| 2.057 | 7.236 | 4943. | .9452 | .9891 | .9503 | 28.10 | .3639 | .001110 |
| 2.122 | 7.427 | 5073. | .9549 | .9910 | .9592 | 28.37 | .3373 | .001149 |
| 2.162 | 7.569 | 5170. | .9547 | .9909 | .9591 | 28.36 | .3176 | .001176 |
| 2.203 | 7.712 | 5268. | .9596 | .9919 | .9635 | 28.50 | .2980 | .001203 |
| 2.249 | 7.872 | 5377. | .9615 | .9922 | .9652 | 28.55 | .2756 | .001234 |
| 2.291 | 8.018 | 5477. | .9656 | .9931 | .9690 | 28.67 | .2562 | .001261 |
| 2.327 | 8.147 | 5565. | .9678 | .9935 | .9710 | 28.73 | .2390 | .001285 |
| 2.376 | 8.316 | 5680. | .9717 | .9943 | .9745 | 28.83 | .2162 | .001316 |
| 2.407 | 8.427 | 5756. | .9727 | .9944 | .9749 | 28.85 | .2023 | .001335 |
| 2.444 | 8.556 | 5844. | .9766 | .9952 | .9789 | 28.97 | .1859 | .001357 |
| 2.503 | 8.761 | 5984. | .9818 | .9963 | .9836 | 29.11 | .1604 | .001392 |
| 2.537 | 8.881 | 6066. | .9820 | .9963 | .9837 | 29.12 | .1459 | .001411 |
| 2.569 | 8.992 | 6142. | .9833 | .9966 | .9850 | 29.15 | .1324 | .001430 |
| 2.617 | 9.161 | 6257. | .9829 | .9965 | .9846 | 29.14 | .1133 | .001455 |
| 2.654 | 9.290 | 6345. | .9880 | .9975 | .9892 | 29.28 | .0989 | .001474 |
| 2.689 | 9.414 | 6430. | .9897 | .9979 | .9907 | 29.33 | .0855 | .001492 |
| 2.748 | 9.619 | 6570. | .9927 | .9985 | .9935 | 29.42 | .0646 | .001520 |
| 2.799 | 9.796 | 6692. | .9898 | .9979 | .9908 | 29.34 | .0474 | .001542 |
| 2.838 | 9.934 | 6786. | .9954 | .9990 | .9958 | 29.49 | .0349 | .001559 |
| 2.892 | 10.090 | 6892. | .9962 | .9992 | .9966 | 29.51 | .0215 | .001576 |
| 2.933 | 10.268 | 7013. | .9970 | .9993 | .9973 | 29.53 | .0074 | .001594 |
| 2.988 | 10.459 | 7144. | .9978 | .9995 | .9980 | 29.55 | 0.0000 | .001604 |
| 3.046 | 10.663 | 7284. | .9971 | .9994 | .9974 | 29.54 | 0.0000 | .001604 |
| 3.079 | 10.779 | 7363. | .9988 | .9997 | .9989 | 29.58 | 0.0000 | .001604 |
| 3.139 | 10.988 | 7505. | .9971 | .9994 | .9974 | 29.54 | 0.0000 | .001604 |
| 3.177 | 11.121 | 7596. | .9983 | .9996 | .9984 | 29.57 | 0.0000 | .001604 |
| 3.219 | 11.268 | 7697. | .9998 | .9999 | .9999 | 29.61 | 0.0000 | .001604 |
| 3.260 | 11.410 | 7794. | .9993 | .9998 | .9994 | 29.60 | 0.0000 | .001604 |
| 3.308 | 11.579 | 7909. | .9996 | .9999 | .9996 | 29.60 | 0.0000 | .001604 |
| 3.365 | 11.779 | 8046. | .9998 | .9999 | .9999 | 29.61 | 0.0000 | .001604 |
| 3.415 | 11.952 | 8164. | 1.0001 | 1.0000 | 1.0001 | 29.62 | 0.0000 | .001604 |
| 3.462 | 12.117 | 8277. | 1.0001 | 1.0000 | 1.0001 | 29.62 | 0.0000 | .001604 |
| 3.521 | 12.326 | 8419. | .9993 | .9998 | .9994 | 29.60 | 0.0000 | .001604 |
| 3.545 | 12.410 | 8477. | 1.0004 | 1.0000 | 1.0003 | 29.63 | 0.0000 | .001604 |

TABLE A 7. (CONT.)
 PROFILE - JPL-5 -- -- PITOT PRESSURE DATA

EDGE MACH NO.= .7995
 X= 7.62 CM

TOTAL PRESSURE= .6638E+05 N/M**2
 TOTAL TEMPERATURE= 311.32 DEG-K

UE= 746.60 M/SEC
 RE-DELTA-STAR= 37820.

DELTA STAR= .4564 CM
 RE-THETA= 24570.

THETA= .2964 CM
 NUWALL= .3845 CM**2/SEC

H= 1.539

LEAST SQUARE FIT PARAMETERS

UTAH= 0.1258 M/SEC
 CHISQR= .8683E-05

CF= .002105
 YMAX= 2.870 CM

PI= .6243
 YMIN= .068 CM

DELTA= 3.0638 CM

| Y (CM) | Y/THETA | Y-PLUS | M/ME | RHO/RHOE | U/UE | U-PLUS | TAU/TAU-MAX | V/U |
|--------|---------|--------|--------|----------|--------|--------|-------------|----------|
| 0.000 | 0.000 | 0. | 0.0000 | .8983 | 0.0000 | 0.00 | 1.0000 | 0.000000 |
| .010 | .034 | 24. | .4090 | .9153 | .4275 | 12.53 | 1.0000 | 0.000000 |
| .016 | .055 | 39. | .4531 | .9192 | .4726 | 13.86 | .9996 | .000002 |
| .036 | .124 | 87. | .5186 | .9256 | .5390 | 15.82 | .9983 | .000108 |
| .048 | .162 | 114. | .5382 | .9277 | .5587 | 16.41 | .9974 | .000012 |
| .068 | .231 | 162. | .5709 | .9314 | .5915 | 17.38 | .9957 | .000018 |
| .090 | .304 | 214. | .5953 | .9343 | .6159 | 18.11 | .9937 | .000024 |
| .115 | .389 | 274. | .6206 | .9375 | .6410 | 18.86 | .9912 | .000032 |
| .138 | .466 | 328. | .6372 | .9396 | .6574 | 19.34 | .9888 | .000039 |
| .160 | .539 | 379. | .6501 | .9413 | .6701 | 19.72 | .9865 | .000046 |
| .176 | .595 | 418. | .6543 | .9418 | .6742 | 19.85 | .9846 | .000051 |
| .198 | .668 | 470. | .6630 | .9430 | .6827 | 20.10 | .9820 | .000058 |
| .232 | .783 | 551. | .6800 | .9453 | .6994 | 20.60 | .9778 | .000069 |
| .278 | .938 | 660. | .6934 | .9472 | .7125 | 20.99 | .9718 | .000084 |
| .298 | 1.006 | 708. | .7055 | .9489 | .7243 | 21.35 | .9691 | .000091 |
| .321 | 1.083 | 762. | .7051 | .9488 | .7230 | 21.34 | .9658 | .000099 |
| .358 | 1.207 | 850. | .7120 | .9498 | .7305 | 21.53 | .9605 | .000111 |
| .396 | 1.302 | 916. | .7186 | .9508 | .7370 | 21.73 | .9563 | .000121 |
| .410 | 1.383 | 973. | .7224 | .9514 | .7407 | 21.84 | .9525 | .000129 |
| .435 | 1.469 | 1033. | .7331 | .9529 | .7510 | 22.15 | .9484 | .000138 |
| .471 | 1.589 | 1118. | .7348 | .9532 | .7526 | 22.20 | .9475 | .000151 |
| .496 | 1.674 | 1178. | .7417 | .9542 | .7592 | 22.40 | .9382 | .000161 |
| .514 | 1.743 | 1226. | .7465 | .9549 | .7639 | 22.54 | .9346 | .000168 |
| .537 | 1.811 | 1275. | .7461 | .9549 | .7635 | 22.53 | .9309 | .000176 |
| .563 | 1.901 | 1338. | .7557 | .9563 | .7727 | 22.80 | .9260 | .000186 |
| .590 | 1.991 | 1401. | .7623 | .9574 | .7791 | 23.00 | .9209 | .000197 |
| .619 | 2.090 | 1470. | .7612 | .9572 | .7780 | 22.97 | .9152 | .000209 |
| .631 | 2.128 | 1498. | .7663 | .9580 | .7829 | 23.11 | .9129 | .000213 |
| .694 | 2.343 | 1648. | .7732 | .9591 | .7895 | 23.31 | .8997 | .000240 |
| .730 | 2.462 | 1733. | .7812 | .9603 | .7972 | 23.54 | .8919 | .000255 |
| .762 | 2.570 | 1808. | .7843 | .9608 | .8001 | 23.63 | .8848 | .000269 |
| .788 | 2.660 | 1871. | .7873 | .9613 | .8029 | 23.72 | .8786 | .000281 |
| .828 | 2.792 | 1965. | .7931 | .9623 | .8085 | 23.89 | .8691 | .000299 |
| .869 | 2.934 | 2044. | .8012 | .9636 | .8162 | 24.12 | .8586 | .000319 |
| .895 | 3.019 | 2125. | .8063 | .9644 | .8211 | 24.27 | .8521 | .000331 |
| .951 | 3.208 | 2257. | .8086 | .9648 | .8232 | 24.33 | .8371 | .000358 |
| .981 | 3.311 | 2330. | .8157 | .9659 | .8300 | 24.54 | .8286 | .000374 |
| 1.017 | 3.431 | 2414. | .8164 | .9661 | .8306 | 24.56 | .8185 | .000392 |
| 1.050 | 3.542 | 2492. | .8238 | .9673 | .8376 | 24.77 | .8087 | .000409 |
| 1.092 | 3.683 | 2592. | .8349 | .9692 | .8481 | 25.08 | .7960 | .000432 |
| 1.123 | 3.790 | 2667. | .8390 | .9699 | .8520 | 25.20 | .7861 | .000449 |

| Y (CM) | Y/THETA | Y-PLUS | TABLE A 7. (CONT.) | | U/UE | H-PLUS | TAU/TAU-MAX | V/U |
|--------|---------|--------|--------------------|----------|--------|--------|-------------|---------|
| | | | M/ME | RHO/RH0E | | | | |
| 1.154 | 3.893 | 2739. | .8438 | .9707 | .8564 | 25.34 | .7763 | .000466 |
| 1.174 | 3.962 | 2788. | .8394 | .9699 | .8523 | 25.21 | .7696 | .000478 |
| 1.212 | 4.090 | 2878. | .8485 | .9715 | .8608 | 25.47 | .7569 | .000449 |
| 1.245 | 4.202 | 2956. | .8481 | .9714 | .8605 | 25.46 | .7456 | .000518 |
| 1.306 | 4.407 | 3101. | .8564 | .9729 | .8683 | 25.70 | .7240 | .000555 |
| 1.344 | 4.536 | 3192. | .8624 | .9739 | .8739 | 25.87 | .7099 | .000578 |
| 1.383 | 4.664 | 3282. | .8717 | .9754 | .8826 | 26.13 | .6958 | .000601 |
| 1.408 | 4.750 | 3342. | .8701 | .9753 | .8811 | 26.09 | .6861 | .000617 |
| 1.442 | 4.865 | 3424. | .8753 | .9762 | .8859 | 26.23 | .6728 | .000639 |
| 1.484 | 5.007 | 3523. | .8816 | .9773 | .8918 | 26.41 | .6561 | .000665 |
| 1.517 | 5.118 | 3602. | .8841 | .9778 | .8941 | 26.48 | .6428 | .000686 |
| 1.548 | 5.221 | 3674. | .8885 | .9785 | .8981 | 26.61 | .6302 | .000706 |
| 1.593 | 5.375 | 3782. | .8910 | .9790 | .9005 | 26.68 | .6111 | .000736 |
| 1.639 | 5.529 | 3891. | .8948 | .9797 | .9040 | 26.78 | .5916 | .000767 |
| 1.696 | 5.722 | 4027. | .9051 | .9816 | .9136 | 27.08 | .5666 | .000805 |
| 1.741 | 5.872 | 4132. | .9085 | .9822 | .9167 | 27.17 | .5469 | .000835 |
| 1.774 | 5.983 | 4210. | .9103 | .9825 | .9184 | 27.22 | .5320 | .000857 |
| 1.807 | 6.095 | 4289. | .9157 | .9836 | .9234 | 27.38 | .5170 | .000880 |
| 1.827 | 6.163 | 4337. | .9191 | .9842 | .9264 | 27.47 | .5077 | .000894 |
| 1.869 | 6.305 | 4436. | .9273 | .9848 | .9294 | 27.56 | .4884 | .000922 |
| 1.901 | 6.412 | 4517. | .9253 | .9853 | .9321 | 27.65 | .4737 | .000944 |
| 1.931 | 6.515 | 4584. | .9301 | .9862 | .9365 | 27.78 | .4594 | .000965 |
| 2.014 | 6.793 | 4780. | .9377 | .9877 | .9435 | 27.99 | .4206 | .001022 |
| 2.048 | 6.909 | 4861. | .9379 | .9877 | .9437 | 28.00 | .4043 | .001045 |
| 2.084 | 7.029 | 4946. | .9370 | .9876 | .9429 | 27.97 | .3874 | .001069 |
| 2.127 | 7.174 | 5048. | .9439 | .9889 | .9492 | 28.17 | .3669 | .001098 |
| 2.157 | 7.277 | 5121. | .9445 | .9890 | .9497 | 28.18 | .3525 | .001119 |
| 2.188 | 7.380 | 5193. | .9502 | .9901 | .9549 | 28.34 | .3380 | .001139 |
| 2.235 | 7.538 | 5305. | .9564 | .9913 | .9606 | 28.52 | .3158 | .001170 |
| 2.279 | 7.688 | 5410. | .9576 | .9915 | .9616 | 28.55 | .2950 | .001199 |
| 2.344 | 7.920 | 5573. | .9616 | .9923 | .9653 | 28.66 | .2631 | .001243 |
| 2.396 | 8.082 | 5687. | .9682 | .9936 | .9713 | 28.85 | .2411 | .001273 |
| 2.429 | 8.194 | 5766. | .9696 | .9939 | .9726 | 28.89 | .2261 | .001294 |
| 2.463 | 8.309 | 5847. | .9740 | .9947 | .9765 | 29.01 | .2108 | .001314 |
| 2.513 | 8.476 | 5965. | .9738 | .9947 | .9763 | 29.00 | .1891 | .001344 |
| 2.562 | 8.644 | 6082. | .9787 | .9957 | .9808 | 29.14 | .1679 | .001372 |
| 2.600 | 8.772 | 6173. | .9797 | .9959 | .9817 | 29.17 | .1520 | .001394 |
| 2.640 | 8.939 | 6290. | .9829 | .9965 | .9846 | 29.26 | .1318 | .001420 |
| 2.689 | 9.072 | 6384. | .9856 | .9971 | .9870 | 29.33 | .1163 | .001441 |
| 2.733 | 9.217 | 6486. | .9893 | .9978 | .9904 | 29.43 | .0998 | .001463 |
| 2.781 | 9.380 | 6601. | .9892 | .9978 | .9903 | 29.43 | .0821 | .001486 |
| 2.821 | 9.517 | 6697. | .9893 | .9978 | .9904 | 29.43 | .0677 | .001505 |
| 2.870 | 9.680 | 6812. | .9916 | .9983 | .9924 | 29.50 | .0515 | .001526 |
| 2.908 | 9.809 | 6902. | .9941 | .9988 | .9947 | 29.56 | .0393 | .001542 |
| 2.947 | 9.941 | 6996. | .9954 | .9990 | .9958 | 29.60 | .0274 | .001558 |
| 2.995 | 10.104 | 7110. | .9949 | .9989 | .9954 | 29.59 | .0136 | .001575 |
| 3.031 | 10.224 | 7195. | .9959 | .9991 | .9963 | 29.62 | .0041 | .001588 |
| 3.067 | 10.344 | 7279. | .9976 | .9995 | .9979 | 29.66 | 0.0000 | .001593 |
| 3.110 | 10.490 | 7381. | .9956 | .9991 | .9961 | 29.61 | 0.0000 | .001593 |
| 3.199 | 10.790 | 7592. | .9974 | .9994 | .9976 | 29.66 | 0.0000 | .001593 |
| 3.282 | 11.072 | 7791. | .9991 | .9998 | .9992 | 29.70 | 0.0000 | .001593 |
| 3.359 | 11.329 | 7972. | .9980 | .9996 | .9982 | 29.67 | 0.0000 | .001593 |
| 3.442 | 11.612 | 8171. | .9995 | .9999 | .9996 | 29.72 | 0.0000 | .001593 |
| 3.540 | 11.942 | 8403. | .9994 | .9998 | .9995 | 29.71 | 0.0000 | .001593 |
| 3.613 | 12.186 | 8575. | 1.0006 | 1.0001 | 1.0005 | 29.75 | 0.0000 | .001593 |
| 3.695 | 12.464 | 8771. | 1.0015 | 1.0003 | 1.0014 | 29.77 | 0.0000 | .001593 |

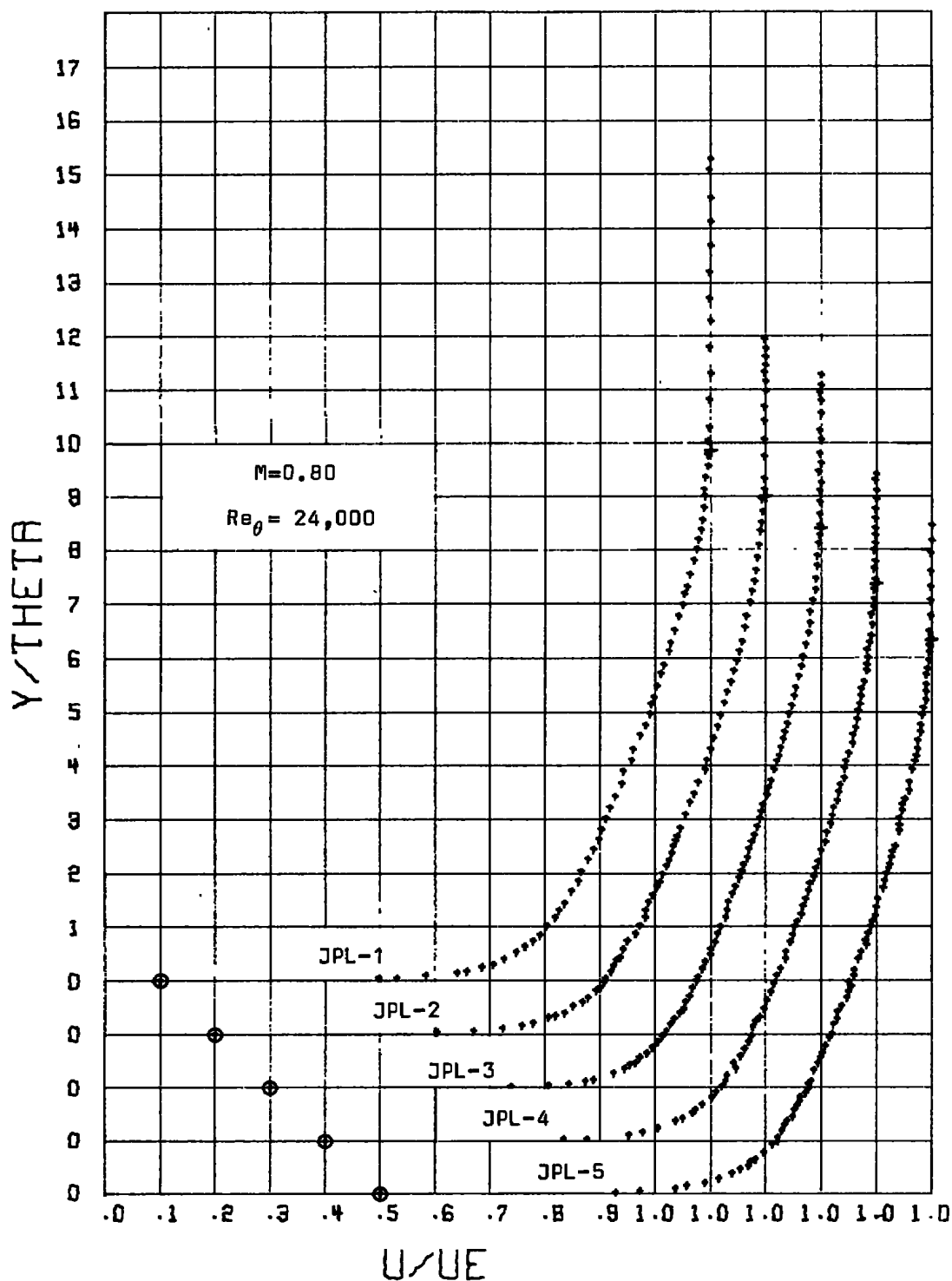


Figure A13. Mean Velocity Profiles.

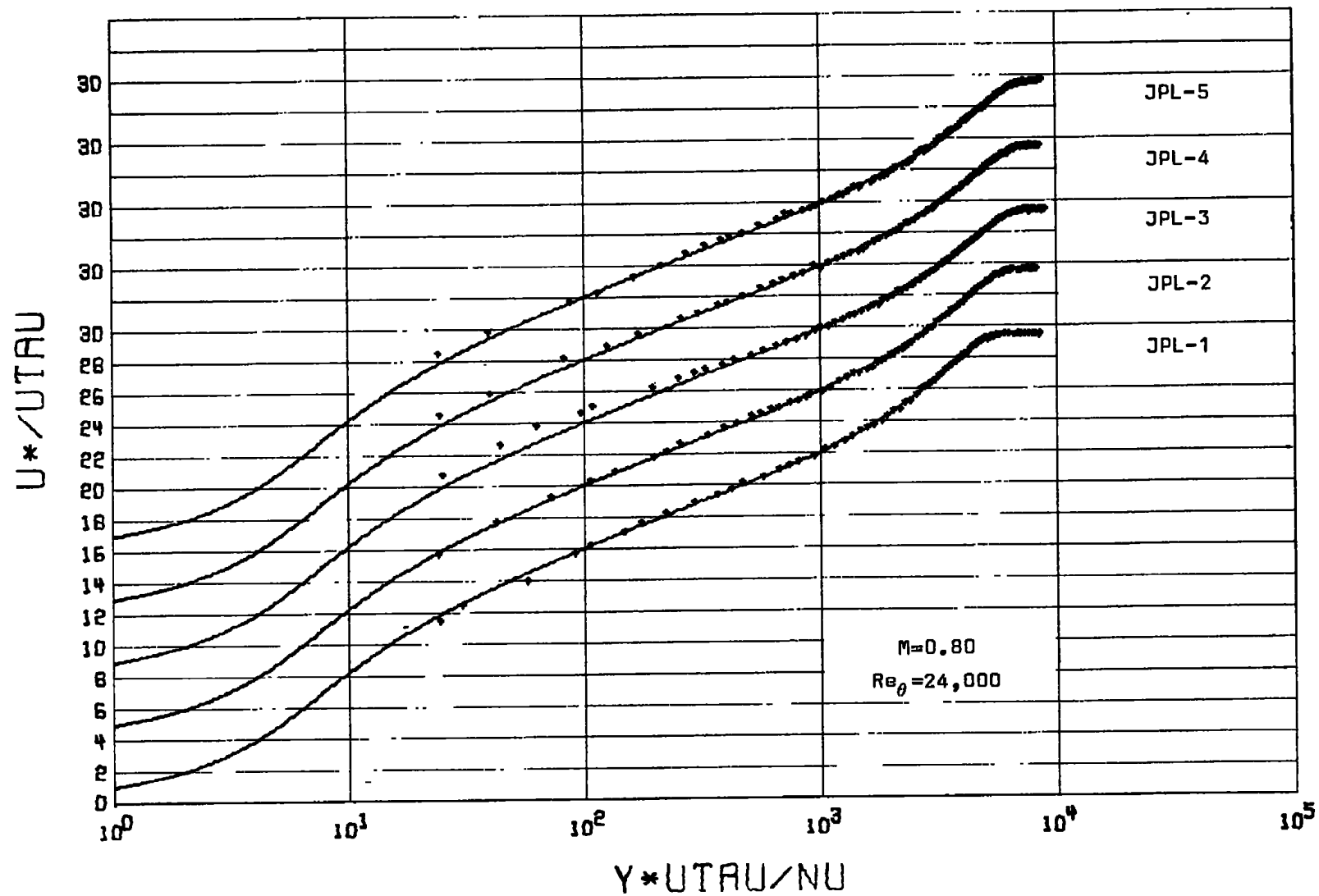


Figure A14. Van Driest Scaled Mean Velocity Profiles.

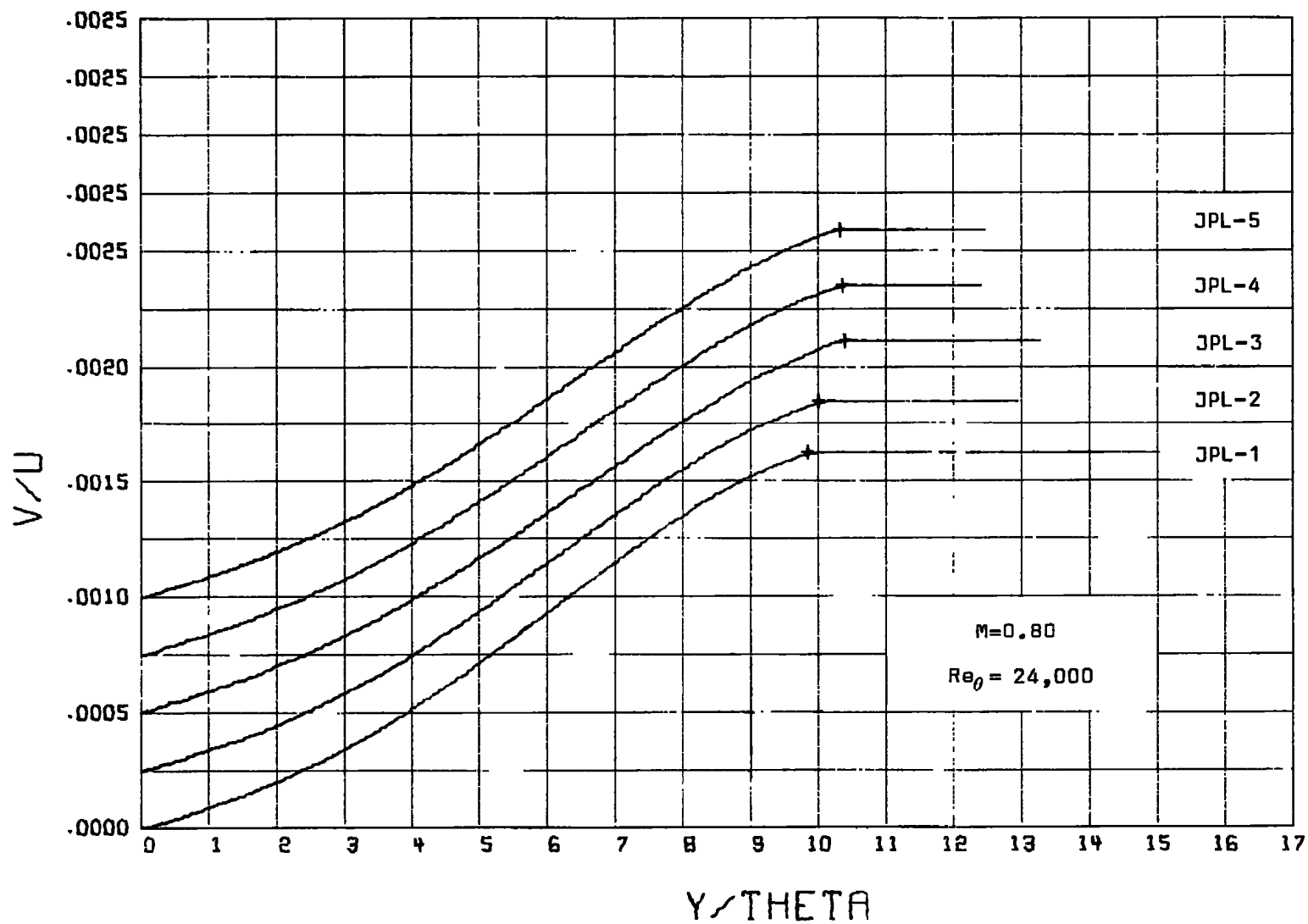


Figure A15. Normal Velocity Distribution.

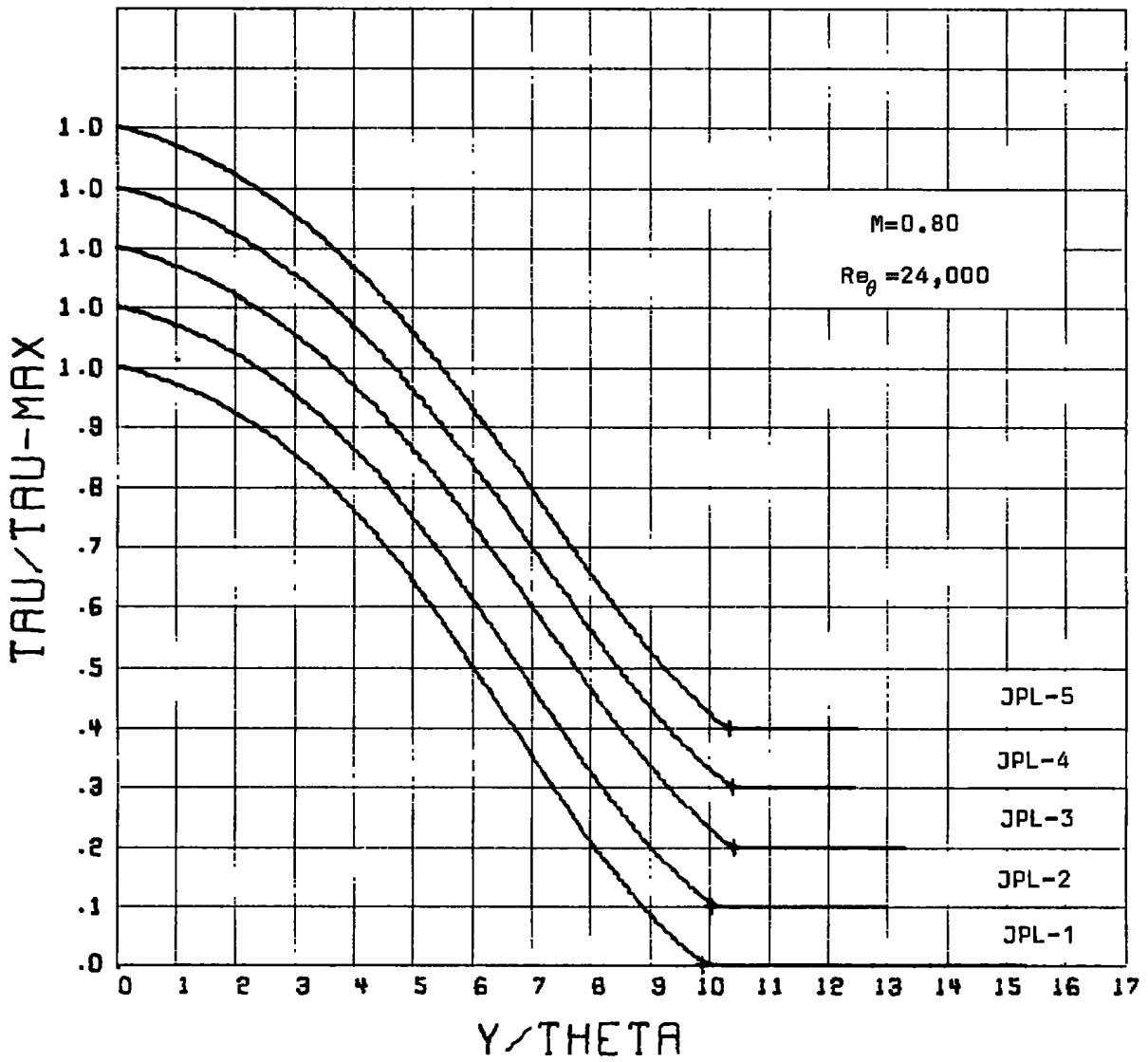


Figure A16. Shear Stress Distribution.

TABLE A 8. DATA SUMMARY
 PROFILE - JPL-1 - - - PITOT PRESSURE DATA

EDGE MACH NO.= .7980 TOTAL PRESSURE= .1333E+06 N/M**2
 X=-48.43 CM TOTAL TEMPERATURE= 324.67 DEG-K

UE= 271.81 M/SFC DELTA STAR= .3225 CM THETA= .2108 CM H= 1.529
 RE-DELTA-STAR= 51910, RE-THETA= 33940. NUWALL= .2077 CM**2/SEC

LEAST SQUARE FIT PARAMETERS
 UTAU= 9.0803 M/SEC CF= .002005 PI= .6306 DELTA= 2.2167 CM
 CHISQR= .7371E-05 YMAX= 2.095 CM YMIN= .044 CM

| Y (CM) | Y/THETA | Y-PLUS | M/ME | RHO/RHOE | U/UE | U-PLUS | TAU/TAU-MAX | V/U |
|--------|---------|--------|--------|----------|--------|--------|-------------|----------|
| 0.000 | 0.000 | 0. | 0.0000 | .8986 | 0.0000 | 0.00 | 1.0000 | 0.000000 |
| .011 | .054 | 49. | .4547 | .9196 | .4741 | 14.24 | 1.0000 | 0.000000 |
| .031 | .150 | 138. | .5280 | .9269 | .5484 | 16.50 | .9980 | .000008 |
| .044 | .210 | 194. | .5652 | .9310 | .5858 | 17.63 | .9965 | .000013 |
| .055 | .264 | 244. | .5874 | .9334 | .6080 | 18.31 | .9951 | .000018 |
| .069 | .331 | 305. | .6144 | .9369 | .6348 | 19.13 | .9932 | .000023 |
| .082 | .391 | 360. | .6320 | .9391 | .6521 | 19.66 | .9914 | .000028 |
| .110 | .523 | 483. | .6574 | .9418 | .6723 | 20.28 | .9873 | .000040 |
| .139 | .667 | 610. | .6673 | .9437 | .6868 | 20.72 | .9826 | .000052 |
| .163 | .776 | 716. | .6798 | .9455 | .6992 | 21.10 | .9785 | .000062 |
| .194 | .921 | 849. | .6923 | .9472 | .7114 | 21.48 | .9730 | .000075 |
| .222 | 1.053 | 971. | .7036 | .9488 | .7223 | 21.81 | .9677 | .000087 |
| .250 | 1.186 | 1093. | .7106 | .9498 | .7291 | 22.02 | .9622 | .000099 |
| .267 | 1.246 | 1149. | .7214 | .9514 | .7396 | 22.34 | .9596 | .000105 |
| .285 | 1.355 | 1249. | .7287 | .9524 | .7467 | 22.56 | .9548 | .000115 |
| .309 | 1.469 | 1354. | .7397 | .9541 | .7573 | 22.89 | .9495 | .000126 |
| .330 | 1.565 | 1443. | .7371 | .9537 | .7547 | 22.81 | .9449 | .000136 |
| .351 | 1.668 | 1537. | .7481 | .9553 | .7653 | 23.14 | .9398 | .000146 |
| .367 | 1.740 | 1604. | .7504 | .9557 | .7675 | 23.21 | .9362 | .000153 |
| .385 | 1.830 | 1687. | .7565 | .9566 | .7735 | 23.39 | .9315 | .000163 |
| .416 | 1.975 | 1821. | .7633 | .9577 | .7799 | 23.59 | .9237 | .000178 |
| .457 | 2.168 | 1998. | .7697 | .9587 | .7861 | 23.78 | .9127 | .000199 |
| .491 | 2.292 | 2104. | .7781 | .9600 | .7941 | 24.03 | .9059 | .000212 |
| .525 | 2.493 | 2298. | .7812 | .9605 | .7971 | 24.12 | .8927 | .000237 |
| .566 | 2.685 | 2476. | .7910 | .9620 | .8064 | 24.41 | .8800 | .000260 |
| .586 | 2.782 | 2565. | .7971 | .9630 | .8122 | 24.59 | .8733 | .000272 |
| .622 | 2.950 | 2720. | .8076 | .9647 | .8222 | 24.90 | .8612 | .000294 |
| .661 | 3.137 | 2892. | .8106 | .9657 | .8250 | 24.99 | .8472 | .000318 |
| .694 | 3.294 | 3037. | .8184 | .9665 | .8325 | 25.22 | .8349 | .000339 |
| .721 | 3.420 | 3153. | .8218 | .9671 | .8356 | 25.32 | .8246 | .000357 |
| .753 | 3.571 | 3292. | .8300 | .9684 | .8434 | 25.56 | .8119 | .000379 |
| .789 | 3.745 | 3453. | .8332 | .9690 | .8465 | 25.65 | .7966 | .000404 |
| .822 | 3.907 | 3597. | .8427 | .9706 | .8554 | 25.93 | .7823 | .000428 |
| .848 | 4.072 | 3708. | .8441 | .9708 | .8567 | 25.97 | .7710 | .000446 |
| .871 | 4.131 | 3808. | .8511 | .9720 | .8632 | 26.17 | .7605 | .000463 |
| .929 | 4.408 | 4064. | .8577 | .9732 | .8694 | 26.37 | .7327 | .000508 |
| .962 | 4.564 | 4208. | .8633 | .9742 | .8747 | 26.53 | .7163 | .000534 |
| .988 | 4.685 | 4319. | .8695 | .9752 | .8804 | 26.71 | .7033 | .000554 |
| 1.029 | 4.884 | 4502. | .8741 | .9761 | .8848 | 26.84 | .6814 | .000588 |
| 1.060 | 5.028 | 4636. | .8785 | .9768 | .8888 | 26.97 | .6649 | .000613 |
| 1.090 | 5.173 | 4769. | .8864 | .9783 | .8962 | 27.20 | .6481 | .000638 |

| Y (CM) | Y/THETA | Y-PLUS | TABLE A 8. (CONT.) | | U/U _E | U-PLUS | TAU/TAU-MAX | V/U |
|--------|---------|--------|--------------------|----------------------|------------------|--------|-------------|---------|
| | | | M/HE | RHO/RHO _E | | | | |
| 1.115 | 5.297 | 4874. | .8899 | .9789 | .8994 | 27.30 | .6346 | .000659 |
| 1.153 | 5.468 | 5041. | .8968 | .9801 | .9058 | 27.50 | .6127 | .000691 |
| 1.198 | 5.636 | 5196. | .8987 | .9805 | .9076 | 27.56 | .5918 | .000727 |
| 1.231 | 5.841 | 5385. | .9023 | .9811 | .9109 | 27.66 | .5659 | .000760 |
| 1.262 | 5.986 | 5518. | .9082 | .9822 | .9164 | 27.83 | .5473 | .000786 |
| 1.295 | 6.142 | 5663. | .9131 | .9831 | .9209 | 27.97 | .5269 | .000816 |
| 1.319 | 6.251 | 5763. | .9194 | .9843 | .9267 | 28.16 | .5126 | .000836 |
| 1.353 | 6.419 | 5918. | .9209 | .9846 | .9281 | 28.20 | .4901 | .000868 |
| 1.386 | 6.576 | 6063. | .9284 | .9860 | .9350 | 28.42 | .4690 | .000897 |
| 1.414 | 6.708 | 6185. | .9319 | .9866 | .9382 | 28.51 | .4511 | .000922 |
| 1.455 | 6.901 | 6362. | .9347 | .9872 | .9407 | 28.60 | .4248 | .000958 |
| 1.492 | 7.076 | 6523. | .9397 | .9881 | .9453 | 28.74 | .4008 | .000991 |
| 1.536 | 7.297 | 6718. | .9464 | .9894 | .9515 | 28.93 | .3719 | .001030 |
| 1.574 | 7.467 | 6884. | .9520 | .9905 | .9566 | 29.09 | .3472 | .001063 |
| 1.620 | 7.684 | 7084. | .9560 | .9912 | .9602 | 29.21 | .3176 | .001103 |
| 1.671 | 7.925 | 7306. | .9601 | .9920 | .9639 | 29.32 | .2850 | .001146 |
| 1.697 | 8.051 | 7423. | .9643 | .9929 | .9678 | 29.44 | .2681 | .001168 |
| 1.744 | 8.274 | 7628. | .9697 | .9939 | .9726 | 29.60 | .2387 | .001206 |
| 1.790 | 8.491 | 7828. | .9722 | .9944 | .9749 | 29.67 | .2108 | .001242 |
| 1.837 | 8.714 | 8034. | .9758 | .9951 | .9781 | 29.77 | .1829 | .001278 |
| 1.871 | 8.976 | 8184. | .9817 | .9963 | .9835 | 29.94 | .1630 | .001303 |
| 1.915 | 9.081 | 8372. | .9825 | .9964 | .9842 | 29.96 | .1389 | .001334 |
| 1.950 | 9.250 | 8528. | .9851 | .9970 | .9866 | 30.04 | .1197 | .001358 |
| 1.997 | 9.473 | 8733. | .9886 | .9977 | .9897 | 30.14 | .0955 | .001389 |
| 2.049 | 9.720 | 8961. | .9910 | .9981 | .9919 | 30.20 | .0704 | .001420 |
| 2.095 | 9.936 | 9161. | .9928 | .9985 | .9935 | 30.26 | .0498 | .001446 |
| 2.125 | 10.081 | 9294. | .9928 | .9985 | .9935 | 30.26 | .0370 | .001461 |
| 2.171 | 10.298 | 9494. | .9943 | .9988 | .9949 | 30.30 | .0192 | .001483 |
| 2.209 | 10.478 | 9660. | .9959 | .9991 | .9963 | 30.34 | .0057 | .001500 |
| 2.240 | 10.623 | 9794. | .9966 | .9993 | .9970 | 30.37 | 0.0000 | .001507 |
| 2.273 | 10.780 | 9938. | .9976 | .9995 | .9978 | 30.39 | 0.0000 | .001507 |
| 2.316 | 10.984 | 10127. | .9977 | .9995 | .9980 | 30.40 | 0.0000 | .001507 |
| 2.397 | 11.370 | 10492. | 1.0001 | 1.0000 | 1.0001 | 30.46 | 0.0000 | .001507 |
| 2.496 | 11.840 | 10915. | 1.0010 | 1.0002 | 1.0009 | 30.49 | 0.0000 | .001507 |
| 2.579 | 12.231 | 11276. | .9999 | .9999 | .9999 | 30.46 | 0.0000 | .001507 |
| 2.661 | 12.622 | 11637. | .9986 | .9997 | .9988 | 30.42 | 0.0000 | .001507 |
| 2.741 | 13.002 | 11987. | .9999 | .9999 | .9999 | 30.46 | 0.0000 | .001507 |
| 2.839 | 13.466 | 12414. | 1.0001 | 1.0000 | 1.0001 | 30.46 | 0.0000 | .001507 |
| 2.926 | 13.875 | 12792. | 1.0001 | 1.0000 | 1.0001 | 30.46 | 0.0000 | .001507 |
| 3.023 | 14.339 | 13219. | .9997 | .9999 | .9998 | 30.45 | 0.0000 | .001507 |
| 3.106 | 14.730 | 13580. | .9988 | .9997 | .9989 | 30.43 | 0.0000 | .001507 |
| 3.196 | 15.110 | 13930. | 1.0014 | 1.0002 | 1.0012 | 30.50 | 0.0000 | .001507 |
| 3.251 | 15.417 | 14213. | .9995 | .9999 | .9996 | 30.45 | 0.0000 | .001507 |
| 3.337 | 15.826 | 14591. | 1.0004 | 1.0001 | 1.0004 | 30.47 | 0.0000 | .001507 |
| 3.436 | 16.296 | 15024. | 1.0004 | 1.0001 | 1.0004 | 30.47 | 0.0000 | .001507 |
| 3.535 | 16.766 | 15457. | 1.0001 | 1.0000 | 1.0001 | 30.46 | 0.0000 | .001507 |

TABLE A 8. (CONT.)
 PROFILE - JPL-2 - - - PITOT PRESSURE DATA

EDGE MACH NO. = .7943 TOTAL PRESSURE = .1334E+06 N/M**2
 X = -26.21 CM TOTAL TEMPERATURE = 328.31 DEG-K

UE = 272.19 M/SEC DELTA STAR = .3610 CM THETA = .2393 CM H = 1.514
 RE-DELTA-STAR = 56600. RE-THETA = 37360. NUHALL = .2108 CM**2/SEC

LEAST SQUARE FIT PARAMETERS
 UTAU = 9.0604 M/SEC CF = .001993 PI = .5901 DELTA = 2.5533 CM
 CHISQR = .1339E-04 YMAX = 2.419 CM YMIN = .039 CM

| Y (CM) | Y/THETA | Y-PLUS | M/ME | RHO/RHOE | U/UE | U-PLUS | TAU/TAU-MAX | V/U |
|--------|---------|--------|--------|----------|--------|--------|-------------|----------|
| 0.000 | 0.000 | 0. | 0.0000 | .8995 | 0.0000 | 0.00 | 1.0000 | 0.000000 |
| .012 | .053 | 54. | .4661 | .9213 | .4856 | 14.64 | 1.0000 | 0.000000 |
| .022 | .106 | 109. | .5325 | .9280 | .5528 | 16.69 | .9989 | .000004 |
| .039 | .165 | 169. | .5706 | .9322 | .5910 | 17.86 | .9975 | .000009 |
| .053 | .223 | 229. | .5901 | .9345 | .6104 | 18.45 | .9960 | .000014 |
| .069 | .293 | 300. | .6135 | .9373 | .6336 | 19.16 | .9940 | .000020 |
| .085 | .357 | 365. | .6287 | .9392 | .6487 | 19.62 | .9922 | .000026 |
| .096 | .405 | 414. | .6420 | .9409 | .6619 | 20.03 | .9907 | .000030 |
| .114 | .479 | 491. | .6528 | .9423 | .6724 | 20.35 | .9883 | .000036 |
| .137 | .575 | 589. | .6705 | .9447 | .6899 | 20.89 | .9851 | .000044 |
| .157 | .660 | 676. | .6756 | .9454 | .6969 | 21.04 | .9821 | .000052 |
| .184 | .772 | 791. | .6915 | .9475 | .7104 | 21.52 | .9780 | .000061 |
| .223 | .937 | 960. | .7010 | .9489 | .7196 | 21.81 | .9716 | .000076 |
| .243 | 1.023 | 1048. | .7084 | .9499 | .7268 | 22.03 | .9682 | .000084 |
| .269 | 1.179 | 1157. | .7139 | .9507 | .7322 | 22.20 | .9637 | .000094 |
| .302 | 1.268 | 1299. | .7282 | .9528 | .7460 | 22.62 | .9577 | .000106 |
| .322 | 1.353 | 1386. | .7302 | .9531 | .7480 | 22.68 | .9539 | .000114 |
| .344 | 1.444 | 1479. | .7390 | .9544 | .7565 | 22.95 | .9497 | .000123 |
| .372 | 1.561 | 1599. | .7408 | .9546 | .7582 | 23.00 | .9440 | .000135 |
| .402 | 1.689 | 1730. | .7519 | .9563 | .7689 | 23.33 | .9377 | .000147 |
| .431 | 1.811 | 1855. | .7552 | .9569 | .7721 | 23.43 | .9314 | .000160 |
| .462 | 1.939 | 1986. | .7607 | .9576 | .7773 | 23.59 | .9245 | .000173 |
| .485 | 2.035 | 2085. | .7666 | .9585 | .7830 | 23.77 | .9192 | .000183 |
| .510 | 2.147 | 2194. | .7720 | .9594 | .7881 | 23.93 | .9132 | .000195 |
| .535 | 2.248 | 2303. | .7773 | .9602 | .7933 | 24.09 | .9069 | .000206 |
| .574 | 2.408 | 2467. | .7818 | .9609 | .7975 | 24.22 | .8972 | .000224 |
| .594 | 2.493 | 2554. | .7878 | .9618 | .8032 | 24.40 | .8918 | .000234 |
| .627 | 2.632 | 2696. | .7965 | .9637 | .8116 | 24.65 | .8878 | .000250 |
| .656 | 2.755 | 2827. | .7996 | .9637 | .8145 | 24.75 | .8745 | .000265 |
| .693 | 2.909 | 2980. | .8077 | .9650 | .8222 | 24.98 | .8637 | .000284 |
| .718 | 3.016 | 3089. | .8107 | .9655 | .8250 | 25.07 | .8560 | .000297 |
| .767 | 3.197 | 3275. | .8166 | .9665 | .8306 | 25.25 | .8424 | .000321 |
| .822 | 3.453 | 3537. | .8262 | .9681 | .8397 | 25.53 | .8222 | .000355 |
| .850 | 3.570 | 3657. | .8300 | .9687 | .8433 | 25.64 | .8125 | .000371 |
| .881 | 3.698 | 3788. | .8342 | .9696 | .8472 | 25.76 | .8016 | .000389 |
| .918 | 3.852 | 3946. | .8370 | .9699 | .8499 | 25.85 | .7880 | .000411 |
| .944 | 3.964 | 4061. | .8456 | .9713 | .8580 | 26.10 | .7778 | .000428 |
| .976 | 4.097 | 4197. | .8474 | .9716 | .8597 | 26.15 | .7654 | .000448 |
| 1.005 | 4.220 | 4323. | .8520 | .9724 | .8640 | 26.29 | .7538 | .000466 |
| 1.043 | 4.380 | 4486. | .8595 | .9737 | .8711 | 26.51 | .7380 | .000491 |
| 1.069 | 4.484 | 4596. | .8630 | .9743 | .8743 | 26.61 | .7274 | .000508 |

| TABLE A 8. (CONT.) | | | | | | | | |
|--------------------|---------|--------|--------|----------|--------|--------|-------------|---------|
| Y (CM) | Y/THETA | Y-PLUS | M/ME | RHO/RHOE | U/UE | U-PLUS | TAU/TAU-MAX | V/U |
| 1.104 | 4.636 | 4748. | .8668 | .9750 | .8778 | 26.72 | .7120 | .000531 |
| 1.144 | 4.801 | 4918. | .8711 | .9757 | .8818 | 26.85 | .6945 | .000558 |
| 1.176 | 4.934 | 5054. | .8760 | .9766 | .8864 | 26.99 | .6800 | .000580 |
| 1.209 | 5.073 | 5196. | .8816 | .9776 | .8916 | 27.15 | .6646 | .000604 |
| 1.238 | 5.195 | 5322. | .8847 | .9781 | .8945 | 27.24 | .6507 | .000624 |
| 1.277 | 5.360 | 5491. | .8905 | .9792 | .8999 | 27.41 | .6316 | .000653 |
| 1.305 | 5.478 | 5611. | .8970 | .9803 | .9059 | 27.60 | .6178 | .000673 |
| 1.342 | 5.632 | 5769. | .8964 | .9802 | .9054 | 27.58 | .5993 | .000700 |
| 1.371 | 5.755 | 5895. | .9011 | .9811 | .9097 | 27.72 | .5844 | .000722 |
| 1.407 | 5.904 | 6048. | .9063 | .9820 | .9146 | 27.87 | .5659 | .000748 |
| 1.437 | 6.032 | 6179. | .9103 | .9827 | .9182 | 27.99 | .5499 | .000771 |
| 1.474 | 6.186 | 6337. | .9145 | .9835 | .9221 | 28.11 | .5302 | .000799 |
| 1.508 | 6.330 | 6484. | .9184 | .9842 | .9257 | 28.22 | .5117 | .000825 |
| 1.553 | 6.517 | 6675. | .9232 | .9851 | .9302 | 28.36 | .4874 | .000859 |
| 1.596 | 6.698 | 6861. | .9275 | .9859 | .9341 | 28.49 | .4636 | .000892 |
| 1.625 | 6.821 | 6987. | .9329 | .9869 | .9390 | 28.64 | .4474 | .000914 |
| 1.658 | 6.959 | 7128. | .9363 | .9876 | .9422 | 28.74 | .4289 | .000939 |
| 1.736 | 7.284 | 7461. | .9440 | .9890 | .9492 | 28.96 | .3853 | .000998 |
| 1.770 | 7.428 | 7609. | .9504 | .9902 | .9551 | 29.15 | .3660 | .001024 |
| 1.818 | 7.631 | 7816. | .9517 | .9905 | .9562 | 29.18 | .3389 | .001060 |
| 1.849 | 7.758 | 7947. | .9550 | .9911 | .9593 | 29.28 | .3215 | .001083 |
| 1.879 | 7.886 | 8078. | .9595 | .9920 | .9634 | 29.41 | .3047 | .001105 |
| 1.913 | 8.030 | 8226. | .9638 | .9928 | .9673 | 29.53 | .2857 | .001130 |
| 1.944 | 8.158 | 8357. | .9667 | .9934 | .9699 | 29.61 | .2689 | .001152 |
| 1.981 | 8.313 | 8515. | .9654 | .9931 | .9687 | 29.58 | .2488 | .001178 |
| 2.006 | 8.419 | 8624. | .9704 | .9941 | .9733 | 29.72 | .2351 | .001195 |
| 2.037 | 8.547 | 8755. | .9729 | .9946 | .9755 | 29.79 | .2188 | .001216 |
| 2.070 | 8.686 | 8897. | .9754 | .9951 | .9778 | 29.86 | .2014 | .001238 |
| 2.101 | 8.819 | 9034. | .9760 | .9952 | .9783 | 29.88 | .1850 | .001259 |
| 2.136 | 8.963 | 9181. | .9797 | .9959 | .9817 | 29.99 | .1676 | .001281 |
| 2.169 | 9.101 | 9323. | .9814 | .9963 | .9833 | 30.04 | .1511 | .001302 |
| 2.194 | 9.208 | 9432. | .9837 | .9967 | .9853 | 30.10 | .1388 | .001318 |
| 2.230 | 9.357 | 9585. | .9843 | .9968 | .9858 | 30.12 | .1218 | .001339 |
| 2.254 | 9.458 | 9689. | .9876 | .9975 | .9888 | 30.21 | .1107 | .001353 |
| 2.288 | 9.602 | 9836. | .9898 | .9979 | .9909 | 30.28 | .0952 | .001372 |
| 2.354 | 9.879 | 10120. | .9912 | .9982 | .9920 | 30.31 | .0669 | .001407 |
| 2.378 | 9.981 | 10223. | .9919 | .9983 | .9927 | 30.33 | .0571 | .001419 |
| 2.419 | 10.151 | 10398. | .9934 | .9986 | .9940 | 30.38 | .0414 | .001439 |
| 2.453 | 10.295 | 10546. | .9941 | .9988 | .9947 | 30.40 | .0287 | .001454 |
| 2.489 | 10.444 | 10698. | .9967 | .9993 | .9970 | 30.47 | .0164 | .001469 |
| 2.519 | 10.572 | 10829. | .9961 | .9992 | .9965 | 30.46 | .0064 | .001481 |
| 2.561 | 10.748 | 11010. | .9967 | .9993 | .9970 | 30.47 | 0.0000 | .001489 |
| 2.597 | 10.897 | 11162. | .9967 | .9993 | .9970 | 30.47 | 0.0000 | .001489 |
| 2.684 | 11.265 | 11539. | .9984 | .9996 | .9985 | 30.52 | 0.0000 | .001489 |
| 2.766 | 11.606 | 11888. | .9989 | .9997 | .9990 | 30.53 | 0.0000 | .001489 |
| 2.843 | 11.931 | 12221. | .9995 | .9999 | .9995 | 30.55 | 0.0000 | .001489 |
| 2.907 | 12.198 | 12494. | 1.0004 | 1.0000 | 1.0003 | 30.58 | 0.0000 | .001489 |
| 2.995 | 12.571 | 12876. | 1.0000 | 1.0000 | 1.0000 | 30.57 | 0.0000 | .001489 |
| 3.073 | 12.896 | 13209. | 1.0004 | 1.0000 | 1.0003 | 30.58 | 0.0000 | .001489 |
| 3.141 | 13.183 | 13504. | 1.0002 | 1.0000 | 1.0002 | 30.57 | 0.0000 | .001489 |
| 3.235 | 13.578 | 13908. | 1.0006 | 1.0001 | 1.0005 | 30.58 | 0.0000 | .001489 |
| 3.319 | 13.979 | 14268. | 1.0000 | 1.0000 | 1.0000 | 30.57 | 0.0000 | .001489 |
| 3.412 | 14.318 | 14667. | .9996 | .9999 | .9997 | 30.56 | 0.0000 | .001489 |
| 3.489 | 14.644 | 15000. | 1.0007 | 1.0001 | 1.0007 | 30.59 | 0.0000 | .001489 |
| 3.553 | 14.910 | 15273. | 1.0002 | 1.0000 | 1.0002 | 30.57 | 0.0000 | .001489 |
| 3.657 | 15.347 | 15720. | .9995 | .9999 | .9995 | 30.55 | 0.0000 | .001489 |

TABLE A 8. (CONT.)
PROFILE - JPL-3 - - - PITOT PRESSURE DATA

EDGE MACH NO.= .7940 TOTAL PRESSURE= .1333E+06 N/M**2
X= -7.62 CM TOTAL TEMPERATURE= 324.67 DEG-K

UE= 270.59 M/SEC DELTA STAR= .3812 CM THETA= .2524 CM H= 1.509
RE-DELTA-STAR= 60680. RE-THETA= 40190. NUWALL= .2065 CM**2/SEC
LEAST SQUARE FIT PARAMETERS
UTAU= 8.9945 M/SEC CF= .001987 PI= .5552 DELTA= 2.7494 CM
CHISQR= .1032E-04 YMAX= 2.580 CM YMIN= .044 CM

| Y (CM) | Y/THETA | Y-PLUS | M/ME | RHO/RH0E | U/UF | U-PLUS | TAU/TAU-MAX | V/U |
|--------|---------|--------|--------|----------|--------|--------|-------------|----------|
| 0.000 | 0.000 | 0. | 0.0000 | .8996 | 0.0000 | 0.00 | 1.0000 | 0.000000 |
| .010 | .040 | 44. | .4335 | .9184 | .4524 | 13.65 | 1.0000 | 0.000000 |
| .013 | .055 | 60. | .4675 | .9215 | .4870 | 14.71 | .9997 | .000001 |
| .029 | .115 | 127. | .5404 | .9289 | .5607 | 16.95 | .9984 | .000006 |
| .044 | .176 | 193. | .5760 | .9329 | .5963 | 18.04 | .9970 | .000011 |
| .068 | .271 | 298. | .6128 | .9373 | .6329 | 19.17 | .9944 | .000019 |
| .087 | .347 | 381. | .6330 | .9398 | .6530 | 19.78 | .9923 | .000025 |
| .111 | .442 | 486. | .6466 | .9415 | .6664 | 20.20 | .9893 | .000033 |
| .130 | .518 | 569. | .6630 | .9437 | .6825 | 20.69 | .9868 | .000040 |
| .154 | .613 | 674. | .6746 | .9452 | .6939 | 21.04 | .9836 | .000048 |
| .176 | .699 | 768. | .6883 | .9471 | .7073 | 21.46 | .9805 | .000055 |
| .200 | .794 | 874. | .6973 | .9484 | .7160 | 21.73 | .9770 | .000063 |
| .228 | .905 | 995. | .7053 | .9495 | .7238 | 21.97 | .9727 | .000073 |
| .274 | 1.086 | 1194. | .7183 | .9514 | .7365 | 22.36 | .9654 | .000089 |
| .295 | 1.171 | 1288. | .7280 | .9528 | .7458 | 22.65 | .9617 | .000097 |
| .335 | 1.327 | 1460. | .7390 | .9544 | .7565 | 22.98 | .9549 | .000111 |
| .365 | 1.448 | 1593. | .7459 | .9554 | .7630 | 23.18 | .9494 | .000123 |
| .388 | 1.539 | 1692. | .7500 | .9560 | .7671 | 23.31 | .9451 | .000131 |
| .416 | 1.649 | 1814. | .7517 | .9563 | .7687 | 23.36 | .9397 | .000142 |
| .440 | 1.780 | 1958. | .7597 | .9575 | .7764 | 23.59 | .9331 | .000155 |
| .477 | 1.891 | 2079. | .7651 | .9583 | .7815 | 23.75 | .9273 | .000166 |
| .509 | 2.016 | 2218. | .7710 | .9592 | .7872 | 23.93 | .9205 | .000179 |
| .528 | 2.092 | 2301. | .7721 | .9594 | .7883 | 23.96 | .9163 | .000186 |
| .567 | 2.248 | 2472. | .7811 | .9608 | .7969 | 24.23 | .9074 | .000203 |
| .596 | 2.364 | 2599. | .7853 | .9615 | .8009 | 24.36 | .9006 | .000215 |
| .642 | 2.545 | 2799. | .7936 | .9628 | .8088 | 24.60 | .8893 | .000236 |
| .675 | 2.675 | 2942. | .7995 | .9637 | .8144 | 24.78 | .8810 | .000251 |
| .737 | 2.922 | 3213. | .8081 | .9651 | .8225 | 25.03 | .8643 | .000260 |
| .772 | 3.058 | 3363. | .8130 | .9659 | .8277 | 25.18 | .8547 | .000296 |
| .812 | 3.219 | 3540. | .8188 | .9669 | .8327 | 25.35 | .8429 | .000316 |
| .835 | 3.309 | 3639. | .8241 | .9678 | .8378 | 25.51 | .8361 | .000328 |
| .878 | 3.480 | 3827. | .8280 | .9684 | .8414 | 25.67 | .8278 | .000350 |
| .910 | 3.606 | 3966. | .8333 | .9693 | .8464 | 25.78 | .8126 | .000367 |
| .938 | 3.717 | 4087. | .8381 | .9701 | .8510 | 25.92 | .8035 | .000382 |
| .970 | 3.842 | 4226. | .8405 | .9705 | .8532 | 25.99 | .7928 | .000399 |
| 1.005 | 3.983 | 4381. | .8467 | .9715 | .8590 | 26.17 | .7805 | .000419 |
| 1.037 | 4.109 | 4519. | .8509 | .9722 | .8629 | 26.29 | .7692 | .000437 |
| 1.070 | 4.240 | 4663. | .8555 | .9730 | .8672 | 26.43 | .7572 | .000456 |
| 1.102 | 4.365 | 4801. | .8613 | .9740 | .8727 | 26.60 | .7453 | .000474 |
| 1.135 | 4.496 | 4945. | .8634 | .9744 | .8746 | 26.66 | .7327 | .000494 |
| 1.170 | 4.637 | 5100. | .8692 | .9754 | .8801 | 26.83 | .7187 | .000515 |

| Y (CM) | Y/THETA | Y-PLUS | TABLE A 8. (CONT.) M/ME | RHO/RHNS | U/UE | U-PLUS | TAU/TAU-MAX | V/U |
|--------|---------|--------|----------------------------|----------|--------|--------|-------------|---------|
| 1.196 | 4.738 | 5210. | .8724 | .9760 | .8830 | 26.97 | .7086 | .000531 |
| 1.229 | 4.868 | 5354. | .8715 | .9758 | .8822 | 26.89 | .6951 | .000551 |
| 1.264 | 5.009 | 5509. | .8777 | .9769 | .8880 | 27.08 | .6802 | .000574 |
| 1.292 | 5.120 | 5631. | .8822 | .9777 | .8922 | 27.21 | .6684 | .000591 |
| 1.319 | 5.226 | 5747. | .8867 | .9785 | .8964 | 27.34 | .6568 | .000609 |
| 1.386 | 5.492 | 6040. | .8928 | .9796 | .9021 | 27.52 | .6270 | .000652 |
| 1.419 | 5.623 | 6184. | .8964 | .9807 | .9054 | 27.62 | .6120 | .000674 |
| 1.447 | 5.734 | 6306. | .9020 | .9812 | .9106 | 27.78 | .5991 | .000693 |
| 1.473 | 5.834 | 6416. | .9051 | .9818 | .9134 | 27.88 | .5872 | .000710 |
| 1.506 | 5.965 | 6560. | .9102 | .9827 | .9182 | 28.02 | .5716 | .000737 |
| 1.546 | 6.126 | 6737. | .9139 | .9834 | .9216 | 28.13 | .5521 | .000760 |
| 1.582 | 6.267 | 6892. | .9187 | .9843 | .9260 | 28.27 | .5349 | .000784 |
| 1.623 | 6.428 | 7069. | .9221 | .9849 | .9291 | 28.37 | .5148 | .000812 |
| 1.653 | 6.548 | 7202. | .9250 | .9855 | .9317 | 28.45 | .4997 | .000833 |
| 1.673 | 6.629 | 7290. | .9262 | .9857 | .9329 | 28.49 | .4895 | .000847 |
| 1.705 | 6.755 | 7429. | .9287 | .9861 | .9351 | 28.56 | .4735 | .000869 |
| 1.732 | 6.860 | 7545. | .9347 | .9872 | .9402 | 28.72 | .4600 | .000888 |
| 1.770 | 7.011 | 7711. | .9385 | .9880 | .9441 | 28.84 | .4406 | .000914 |
| 1.808 | 7.162 | 7877. | .9413 | .9885 | .9467 | 28.92 | .4212 | .000940 |
| 1.835 | 7.268 | 7993. | .9423 | .9887 | .9477 | 28.95 | .4075 | .000959 |
| 1.873 | 7.419 | 8159. | .9477 | .9897 | .9526 | 29.11 | .3875 | .000986 |
| 1.935 | 7.665 | 8430. | .9501 | .9902 | .9548 | 29.18 | .3560 | .001027 |
| 1.965 | 7.786 | 8563. | .9548 | .9911 | .9591 | 29.31 | .3403 | .001049 |
| 2.001 | 7.927 | 8718. | .9568 | .9915 | .9609 | 29.37 | .3221 | .001072 |
| 2.032 | 8.047 | 8850. | .9603 | .9921 | .9641 | 29.47 | .3066 | .001092 |
| 2.062 | 8.168 | 8983. | .9647 | .9929 | .9676 | 29.58 | .2912 | .001112 |
| 2.099 | 8.314 | 9144. | .9652 | .9931 | .9686 | 29.61 | .2727 | .001136 |
| 2.125 | 8.420 | 9260. | .9689 | .9938 | .9719 | 29.72 | .2593 | .001153 |
| 2.169 | 8.591 | 9448. | .9718 | .9944 | .9745 | 29.80 | .2381 | .001180 |
| 2.202 | 8.721 | 9592. | .9712 | .9943 | .9740 | 29.78 | .2221 | .001201 |
| 2.230 | 8.832 | 9713. | .9767 | .9953 | .9790 | 29.94 | .2085 | .001218 |
| 2.270 | 8.993 | 9890. | .9775 | .9955 | .9797 | 29.96 | .1894 | .001247 |
| 2.308 | 9.144 | 10056. | .9818 | .9963 | .9836 | 30.09 | .1716 | .001265 |
| 2.374 | 9.405 | 10344. | .9854 | .9970 | .9868 | 30.19 | .1422 | .001302 |
| 2.415 | 9.566 | 10521. | .9843 | .9968 | .9858 | 30.16 | .1246 | .001324 |
| 2.448 | 9.697 | 10665. | .9875 | .9975 | .9887 | 30.25 | .1107 | .001341 |
| 2.490 | 9.863 | 10847. | .9912 | .9982 | .9920 | 30.36 | .0937 | .001362 |
| 2.537 | 10.049 | 11052. | .9901 | .9980 | .9911 | 30.32 | .0754 | .001385 |
| 2.580 | 10.220 | 11240. | .9932 | .9986 | .9939 | 30.42 | .0595 | .001404 |
| 2.618 | 10.371 | 11406. | .9936 | .9987 | .9942 | 30.43 | .0460 | .001421 |
| 2.661 | 10.542 | 11594. | .9949 | .9989 | .9954 | 30.46 | .0316 | .001438 |
| 2.705 | 10.713 | 11782. | .9958 | .9991 | .9962 | 30.49 | .0181 | .001455 |
| 2.745 | 10.874 | 11959. | .9966 | .9993 | .9969 | 30.51 | .0063 | .001469 |
| 2.795 | 11.030 | 12131. | .9973 | .9994 | .9976 | 30.53 | 0.0000 | .001477 |
| 2.821 | 11.176 | 12291. | .9967 | .9993 | .9971 | 30.52 | 0.0000 | .001477 |
| 2.900 | 11.488 | 12634. | .9991 | .9998 | .9992 | 30.58 | 0.0000 | .001477 |
| 2.971 | 11.769 | 12944. | .9988 | .9997 | .9989 | 30.57 | 0.0000 | .001477 |
| 3.055 | 12.101 | 13309. | .9995 | .9999 | .9996 | 30.59 | 0.0000 | .001477 |
| 3.144 | 12.454 | 13696. | .9991 | .9998 | .9992 | 30.58 | 0.0000 | .001477 |
| 3.218 | 12.745 | 14017. | 1.0004 | 1.0000 | 1.0004 | 30.62 | 0.0000 | .001477 |
| 3.305 | 13.092 | 14399. | 1.0004 | 1.0000 | 1.0004 | 30.62 | 0.0000 | .001477 |
| 3.384 | 13.404 | 14742. | 1.0002 | 1.0000 | 1.0002 | 30.61 | 0.0000 | .001477 |
| 3.454 | 13.681 | 15046. | 1.0002 | 1.0000 | 1.0002 | 30.61 | 0.0000 | .001477 |
| 3.536 | 14.008 | 15406. | .9995 | .9999 | .9996 | 30.59 | 0.0000 | .001477 |
| 3.619 | 14.335 | 15765. | 1.0004 | 1.0000 | 1.0004 | 30.62 | 0.0000 | .001477 |
| 3.698 | 14.647 | 16108. | .9997 | .9999 | .9997 | 30.60 | 0.0000 | .001477 |

TABLE A 8. (CONT.)
 PROFILE - JPL-4 - - - PIVOT PRESSURE DATA

EDGE MACH NO.= .7921
 X= 0.00 CM

TOTAL PRESSURE= .1333E+06 N/M**2
 TOTAL TEMPERATURE= 328.31 DEG-K

UE= 271.52 M/SEC
 RE-DELTA-STAR= 61990.

DELTA STAR= .3979 CM
 RE-THETA= 41090.

THETA= .2637 CM
 NUWALL= .2101 CM**2/SEC

H= 1.508
 CF= .001942

LEAST SQUARE FIT PARAMETERS

UTAH= 9.0022 M/SEC
 CHISQR= .8759E-05

CF= .001978
 YMAX= 2.729 CM

PI= .5579
 YMIN= .027 CM

DELTA= 2.8696 CM

| Y (CM) | Y/THETA | Y-PLUS | M/ME | RHO/RHME | U/UE | U-PLUS | TAU/TAU-MAX | V/U |
|--------|---------|--------|--------|----------|--------|--------|-------------|----------|
| 0.000 | 0.000 | 0. | 0.0000 | .9000 | 0.0000 | 0.00 | 1.0000 | 0.000000 |
| .010 | .038 | 43. | .4370 | .9191 | .4559 | 13.79 | 1.0000 | 0.000000 |
| .017 | .067 | 76. | .4966 | .9246 | .5164 | 15.64 | .9994 | .000002 |
| .027 | .105 | 119. | .5418 | .9293 | .5620 | 17.04 | .9986 | .000005 |
| .049 | .187 | 212. | .5760 | .9337 | .5963 | 18.09 | .9967 | .000012 |
| .068 | .259 | 293. | .6055 | .9366 | .6256 | 18.99 | .9947 | .000018 |
| .087 | .332 | 375. | .6241 | .9389 | .6441 | 19.56 | .9926 | .000024 |
| .106 | .404 | 457. | .6448 | .9416 | .6645 | 20.19 | .9904 | .000030 |
| .121 | .462 | 522. | .6516 | .9424 | .6712 | 20.40 | .9886 | .000035 |
| .140 | .534 | 604. | .6621 | .9438 | .6816 | 20.72 | .9862 | .000041 |
| .152 | .577 | 652. | .6703 | .9449 | .6895 | 20.96 | .9847 | .000045 |
| .177 | .674 | 761. | .6868 | .9471 | .7057 | 21.46 | .9813 | .000053 |
| .205 | .779 | 881. | .6945 | .9482 | .7132 | 21.70 | .9774 | .000062 |
| .231 | .876 | 990. | .6982 | .9487 | .7168 | 21.81 | .9737 | .000070 |
| .256 | .972 | 1099. | .7133 | .9509 | .7315 | 22.26 | .9699 | .000079 |
| .287 | 1.088 | 1229. | .7210 | .9520 | .7390 | 22.49 | .9652 | .000089 |
| .304 | 1.155 | 1305. | .7210 | .9520 | .7390 | 22.49 | .9623 | .000095 |
| .327 | 1.242 | 1403. | .7298 | .9532 | .7475 | 22.76 | .9585 | .000103 |
| .355 | 1.348 | 1523. | .7370 | .9543 | .7544 | 22.97 | .9538 | .000113 |
| .387 | 1.468 | 1659. | .7440 | .9553 | .7612 | 23.18 | .9482 | .000124 |
| .406 | 1.540 | 1741. | .7491 | .9561 | .7661 | 23.34 | .9448 | .000131 |
| .431 | 1.636 | 1850. | .7529 | .9567 | .7698 | 23.45 | .9401 | .000140 |
| .450 | 1.709 | 1931. | .7549 | .9570 | .7716 | 23.51 | .9365 | .000147 |
| .485 | 1.839 | 2078. | .7626 | .9581 | .7791 | 23.74 | .9298 | .000160 |
| .515 | 1.954 | 2209. | .7661 | .9587 | .7824 | 23.84 | .9236 | .000172 |
| .538 | 2.041 | 2307. | .7721 | .9596 | .7881 | 24.02 | .9189 | .000181 |
| .566 | 2.147 | 2426. | .7768 | .9603 | .7927 | 24.16 | .9129 | .000192 |
| .601 | 2.282 | 2574. | .7834 | .9613 | .7990 | 24.36 | .9051 | .000206 |
| .646 | 2.450 | 2769. | .7897 | .9623 | .8050 | 24.55 | .8949 | .000224 |
| .678 | 2.570 | 2905. | .7972 | .9635 | .8121 | 24.77 | .8874 | .000238 |
| .716 | 2.715 | 3069. | .8008 | .9641 | .8155 | 24.88 | .8780 | .000254 |
| .759 | 2.879 | 3254. | .8061 | .9649 | .8206 | 25.03 | .8669 | .000274 |
| .795 | 3.013 | 3406. | .8154 | .9665 | .8294 | 25.31 | .8574 | .000290 |
| .831 | 3.153 | 3564. | .8203 | .9673 | .8341 | 25.46 | .8472 | .000307 |
| .863 | 3.273 | 3700. | .8248 | .9680 | .8383 | 25.59 | .8382 | .000322 |
| .903 | 3.442 | 3890. | .8267 | .9683 | .8401 | 25.64 | .8252 | .000344 |
| .939 | 3.562 | 4026. | .8335 | .9694 | .8465 | 25.85 | .8155 | .000360 |
| .982 | 3.726 | 4211. | .8407 | .9706 | .8533 | 26.06 | .8020 | .000382 |
| 1.021 | 3.870 | 4375. | .8426 | .9710 | .8551 | 26.11 | .7896 | .000402 |
| 1.060 | 4.053 | 4581. | .8497 | .9722 | .8618 | 26.32 | .7734 | .000428 |
| 1.104 | 4.184 | 4734. | .8527 | .9727 | .8646 | 26.41 | .7611 | .000447 |

| Y (CM) | Y/THETA | Y-PLUS | TABLE A B. (CONT.) M/ME | RHO/RHOE | U/U* | U-PLUS | TAU/TAU-MAX | V/U |
|--------|---------|--------|----------------------------|----------|--------|--------|-------------|---------|
| 1.148 | 4.352 | 4919. | .8587 | .9737 | .8702 | 26.59 | .7457 | .000471 |
| 1.183 | 4.487 | 5071. | .8631 | .9745 | .8743 | 26.72 | .7326 | .000491 |
| 1.221 | 4.631 | 5234. | .8677 | .9753 | .8787 | 26.85 | .7183 | .000513 |
| 1.259 | 4.775 | 5398. | .8736 | .9763 | .8842 | 27.03 | .7035 | .000536 |
| 1.296 | 4.915 | 5555. | .8786 | .9772 | .8888 | 27.17 | .6888 | .000558 |
| 1.336 | 5.064 | 5724. | .8830 | .9779 | .8929 | 27.30 | .6731 | .000581 |
| 1.374 | 5.209 | 5887. | .8861 | .9785 | .8957 | 27.39 | .6573 | .000605 |
| 1.417 | 5.372 | 6072. | .8912 | .9794 | .9006 | 27.54 | .6391 | .000631 |
| 1.463 | 5.546 | 6268. | .8954 | .9801 | .9044 | 27.66 | .6193 | .000660 |
| 1.503 | 5.700 | 6442. | .9023 | .9814 | .9108 | 27.86 | .6014 | .000686 |
| 1.550 | 5.878 | 6644. | .9071 | .9823 | .9153 | 28.00 | .5803 | .000716 |
| 1.595 | 6.046 | 6834. | .9102 | .9828 | .9181 | 28.09 | .5599 | .000745 |
| 1.638 | 6.210 | 7019. | .9135 | .9834 | .9212 | 28.19 | .5399 | .000773 |
| 1.673 | 6.345 | 7172. | .9180 | .9842 | .9253 | 28.32 | .5231 | .000796 |
| 1.713 | 6.494 | 7340. | .9239 | .9853 | .9307 | 28.49 | .5044 | .000822 |
| 1.752 | 6.643 | 7509. | .9267 | .9858 | .9333 | 28.57 | .4855 | .000848 |
| 1.788 | 6.778 | 7661. | .9300 | .9864 | .9363 | 28.67 | .4683 | .000872 |
| 1.821 | 6.903 | 7803. | .9335 | .9871 | .9396 | 28.77 | .4522 | .000894 |
| 1.859 | 7.048 | 7966. | .9381 | .9880 | .9438 | 28.90 | .4333 | .000919 |
| 1.896 | 7.187 | 8124. | .9408 | .9885 | .9463 | 28.98 | .4154 | .000943 |
| 1.930 | 7.317 | 8271. | .9441 | .9891 | .9493 | 29.08 | .3985 | .000966 |
| 1.965 | 7.452 | 8423. | .9494 | .9901 | .9541 | 29.23 | .3810 | .000989 |
| 2.006 | 7.606 | 8597. | .9481 | .9899 | .9579 | 29.19 | .3609 | .001016 |
| 2.049 | 7.770 | 8782. | .9547 | .9911 | .9590 | 29.38 | .3396 | .001043 |
| 2.087 | 7.914 | 8946. | .9566 | .9915 | .9607 | 29.44 | .3209 | .001068 |
| 2.125 | 8.059 | 9109. | .9592 | .9920 | .9630 | 29.51 | .3023 | .001092 |
| 2.169 | 8.223 | 9294. | .9623 | .9926 | .9659 | 29.60 | .2813 | .001119 |
| 2.213 | 8.391 | 9484. | .9694 | .9939 | .9723 | 29.81 | .2599 | .001146 |
| 2.263 | 8.579 | 9696. | .9721 | .9945 | .9748 | 29.89 | .2365 | .001176 |
| 2.307 | 8.747 | 9887. | .9745 | .9949 | .9769 | 29.95 | .2157 | .001203 |
| 2.343 | 8.882 | 10039. | .9755 | .9951 | .9778 | 29.98 | .1994 | .001223 |
| 2.385 | 9.041 | 10219. | .9803 | .9961 | .9823 | 30.12 | .1805 | .001247 |
| 2.429 | 9.210 | 10409. | .9815 | .9963 | .9833 | 30.16 | .1609 | .001272 |
| 2.479 | 9.397 | 10622. | .9842 | .9968 | .9857 | 30.23 | .1397 | .001298 |
| 2.522 | 9.561 | 10807. | .9859 | .9972 | .9873 | 30.28 | .1218 | .001320 |
| 2.564 | 9.720 | 10986. | .9881 | .9976 | .9893 | 30.35 | .1046 | .001341 |
| 2.603 | 9.869 | 11155. | .9900 | .9980 | .9910 | 30.40 | .0897 | .001360 |
| 2.654 | 10.062 | 11372. | .9920 | .9984 | .9928 | 30.46 | .0708 | .001383 |
| 2.691 | 10.201 | 11530. | .9937 | .9987 | .9943 | 30.51 | .0578 | .001399 |
| 2.729 | 10.346 | 11694. | .9928 | .9985 | .9935 | 30.48 | .0448 | .001415 |
| 2.771 | 10.505 | 11873. | .9948 | .9989 | .9954 | 30.54 | .0313 | .001431 |
| 2.819 | 10.688 | 12080. | .9952 | .9990 | .9957 | 30.55 | .0168 | .001449 |
| 2.857 | 10.832 | 12243. | .9958 | .9991 | .9962 | 30.56 | .0060 | .001462 |
| 2.898 | 10.986 | 12417. | .9980 | .9996 | .9982 | 30.63 | 0.0000 | .001469 |
| 2.947 | 11.174 | 12629. | .9974 | .9994 | .9977 | 30.61 | 0.0000 | .001469 |
| 3.012 | 11.419 | 12907. | .9980 | .9996 | .9982 | 30.63 | 0.0000 | .001469 |
| 3.096 | 11.737 | 13266. | .9991 | .9998 | .9992 | 30.66 | 0.0000 | .001469 |
| 3.183 | 12.069 | 13642. | .9996 | .9999 | .9997 | 30.68 | 0.0000 | .001469 |
| 3.271 | 12.401 | 14017. | .9995 | .9999 | .9995 | 30.67 | 0.0000 | .001469 |
| 3.357 | 12.729 | 14387. | 1.0000 | 1.0000 | 1.0000 | 30.69 | 0.0000 | .001469 |
| 3.456 | 13.104 | 14812. | .9987 | .9997 | .9989 | 30.65 | 0.0000 | .001469 |
| 3.544 | 13.437 | 15187. | .9989 | .9997 | .9990 | 30.65 | 0.0000 | .001469 |
| 3.581 | 13.576 | 15345. | 1.0006 | 1.0001 | 1.0005 | 30.70 | 0.0000 | .001469 |
| 3.651 | 13.841 | 15644. | 1.0004 | 1.0000 | 1.0003 | 30.70 | 0.0000 | .001469 |
| 3.695 | 14.010 | 15835. | .9995 | .9999 | .9995 | 30.67 | 0.0000 | .001469 |

TABLE A 8. (CONT.)
PROFILE - JPL-5 - - - PITOT PRESSURE DATA

EDGE MACH NO.= .7919 TOTAL PRESSURE= .1330E+06 N/M**2
X= 7.62 CM TOTAL TEMPERATURE= 328.55 DEG-K

UE= 271.55 M/SEC DELTA STAR= .4155 CM THETA= .2747 CM H= 1.512
RE-DELTA-STAR= 64440. RE-THETA= 42600. NUWALL= .2105 CM**2/SEC
LEAST SQUARE FIT PARAMETERS
UTAU= 8.9444 M/SEC CF= .001953 PI= .5867 DELTA= 2.9659 CM
CHISQR= .1002E-04 YMAX= 2.806 CM YMIN= .024 CM

| Y (CM) | Y/THETA | Y-PLUS | M/ME | RHO/RHOE | U/UF | U-PLUS | TAU/TAU-MAX | V/U |
|--------|---------|--------|--------|----------|--------|--------|-------------|----------|
| 0.000 | 0.000 | 0. | 0.0000 | .9000 | 0.0000 | 0.00 | 1.0000 | 0.000000 |
| .010 | .036 | 43. | .4350 | .9190 | .4538 | 13.82 | 1.0000 | 0.000000 |
| .024 | .087 | 102. | .5023 | .9253 | .5272 | 15.92 | .9990 | .000004 |
| .050 | .184 | 215. | .5700 | .9325 | .5903 | 18.02 | .9968 | .000012 |
| .066 | .240 | 280. | .6018 | .9362 | .6270 | 19.00 | .9953 | .000016 |
| .088 | .323 | 377. | .6191 | .9383 | .6391 | 19.53 | .9930 | .000023 |
| .116 | .425 | 496. | .6436 | .9414 | .6633 | 20.29 | .9999 | .000031 |
| .132 | .480 | 561. | .6625 | .9439 | .6819 | 20.86 | .9881 | .000036 |
| .170 | .619 | 723. | .6722 | .9452 | .6914 | 21.16 | .9834 | .000048 |
| .187 | .684 | 798. | .6835 | .9467 | .7025 | 21.50 | .9811 | .000053 |
| .217 | .790 | 922. | .6938 | .9481 | .7175 | 21.81 | .9772 | .000062 |
| .246 | .896 | 1046. | .7050 | .9497 | .7234 | 22.16 | .9737 | .000071 |
| .273 | .993 | 1160. | .7122 | .9507 | .7304 | 22.37 | .9693 | .000079 |
| .302 | 1.100 | 1284. | .7186 | .9516 | .7367 | 22.57 | .9649 | .000089 |
| .334 | 1.215 | 1419. | .7225 | .9522 | .7404 | 22.68 | .9600 | .000099 |
| .361 | 1.317 | 1537. | .7354 | .9541 | .7529 | 23.08 | .9555 | .000108 |
| .386 | 1.405 | 1640. | .7427 | .9552 | .7600 | 23.30 | .9515 | .000116 |
| .411 | 1.497 | 1748. | .7447 | .9555 | .7619 | 23.36 | .9472 | .000125 |
| .462 | 1.642 | 1964. | .7509 | .9564 | .7678 | 23.54 | .9382 | .000143 |
| .485 | 1.765 | 2061. | .7615 | .9580 | .7780 | 23.86 | .9340 | .000151 |
| .515 | 1.876 | 2190. | .7626 | .9581 | .7791 | 23.89 | .9282 | .000162 |
| .556 | 2.024 | 2363. | .7701 | .9593 | .7863 | 24.17 | .9202 | .000177 |
| .594 | 2.163 | 2525. | .7789 | .9607 | .7947 | 24.38 | .9124 | .000191 |
| .626 | 2.279 | 2660. | .7800 | .9608 | .7957 | 24.42 | .9056 | .000203 |
| .657 | 2.394 | 2795. | .7849 | .9616 | .8004 | 24.56 | .8986 | .000216 |
| .695 | 2.496 | 2914. | .7901 | .9624 | .8054 | 24.72 | .8923 | .000227 |
| .716 | 2.607 | 3043. | .7963 | .9634 | .8112 | 24.90 | .8852 | .000240 |
| .756 | 2.755 | 3216. | .8036 | .9646 | .8182 | 25.12 | .8754 | .000257 |
| .787 | 2.866 | 3345. | .8044 | .9647 | .8189 | 25.15 | .8678 | .000270 |
| .828 | 3.014 | 3518. | .8109 | .9657 | .8252 | 25.34 | .8573 | .000288 |
| .855 | 3.115 | 3637. | .8156 | .9665 | .8296 | 25.48 | .8499 | .000300 |
| .892 | 3.249 | 3793. | .8188 | .9670 | .8327 | 25.58 | .8398 | .000317 |
| .922 | 3.356 | 3917. | .8262 | .9682 | .8396 | 25.80 | .8315 | .000331 |
| .967 | 3.527 | 4112. | .8344 | .9696 | .8473 | 26.04 | .8182 | .000352 |
| 1.003 | 3.652 | 4263. | .8358 | .9698 | .8487 | 26.08 | .8074 | .000370 |
| 1.028 | 3.744 | 4371. | .8411 | .9707 | .8537 | 26.24 | .7996 | .000382 |
| 1.080 | 3.934 | 4592. | .8425 | .9710 | .8550 | 26.28 | .7828 | .000409 |
| 1.112 | 4.049 | 4727. | .8491 | .9721 | .8612 | 26.48 | .7725 | .000425 |
| 1.143 | 4.160 | 4856. | .8512 | .9724 | .8632 | 26.54 | .7622 | .000441 |
| 1.177 | 4.285 | 5007. | .8532 | .9728 | .8651 | 26.60 | .7503 | .000460 |
| 1.214 | 4.419 | 5158. | .8606 | .9740 | .8720 | 26.82 | .7372 | .000480 |

| Y (CM) | Y/THETA | Y-PLUS | TABLE A 8. (CONT.) | | U/U _E | U-PLUS | TAU/TAU-MAX | V/U |
|--------|---------|--------|--------------------|----------|------------------|--------|-------------|---------|
| | | | N/ME | RHO/RHOF | | | | |
| 1.257 | 4.576 | 5342. | .8665 | .9751 | .8775 | 26.99 | .7215 | .000504 |
| 1.287 | 4.647 | 5471. | .8704 | .9757 | .8811 | 27.11 | .7101 | .000521 |
| 1.330 | 4.844 | 5655. | .8733 | .9762 | .8839 | 27.19 | .6935 | .000546 |
| 1.363 | 4.964 | 5795. | .8774 | .9770 | .8877 | 27.31 | .6807 | .000565 |
| 1.393 | 5.071 | 5919. | .8839 | .9781 | .8937 | 27.50 | .6691 | .000582 |
| 1.470 | 5.353 | 6249. | .8897 | .9791 | .9091 | 27.68 | .6373 | .000628 |
| 1.501 | 5.464 | 6378. | .8940 | .9799 | .9031 | 27.80 | .6242 | .000647 |
| 1.540 | 5.607 | 6545. | .8990 | .9808 | .9078 | 27.95 | .6076 | .000671 |
| 1.579 | 5.750 | 6713. | .9007 | .9811 | .9094 | 28.00 | .5905 | .000695 |
| 1.611 | 5.866 | 6848. | .9040 | .9817 | .9123 | 28.09 | .5764 | .000715 |
| 1.641 | 6.009 | 7015. | .9106 | .9829 | .9184 | 28.29 | .5588 | .000740 |
| 1.689 | 6.148 | 7177. | .9140 | .9835 | .9216 | 28.39 | .5415 | .000764 |
| 1.719 | 6.259 | 7306. | .9190 | .9844 | .9262 | 28.53 | .5275 | .000783 |
| 1.760 | 6.407 | 7479. | .9217 | .9849 | .9287 | 28.61 | .5087 | .000809 |
| 1.795 | 6.536 | 7630. | .9260 | .9857 | .9327 | 28.74 | .4920 | .000831 |
| 1.833 | 6.675 | 7792. | .9275 | .9860 | .9340 | 28.78 | .4741 | .000856 |
| 1.866 | 6.795 | 7932. | .9322 | .9869 | .9384 | 28.92 | .4584 | .000877 |
| 1.898 | 6.911 | 8067. | .9347 | .9873 | .9406 | 28.99 | .4432 | .000897 |
| 1.935 | 7.045 | 8224. | .9381 | .9880 | .9438 | 29.09 | .4255 | .000921 |
| 1.968 | 7.165 | 8364. | .9409 | .9885 | .9464 | 29.18 | .4096 | .000942 |
| 2.000 | 7.281 | 8499. | .9428 | .9888 | .9480 | 29.23 | .3943 | .000962 |
| 2.033 | 7.401 | 8639. | .9472 | .9897 | .9521 | 29.36 | .3784 | .000983 |
| 2.075 | 7.553 | 8817. | .9500 | .9902 | .9546 | 29.44 | .3581 | .001009 |
| 2.110 | 7.683 | 8968. | .9544 | .9911 | .9587 | 29.57 | .3410 | .001031 |
| 2.139 | 7.789 | 9092. | .9547 | .9911 | .9590 | 29.58 | .3270 | .001050 |
| 2.167 | 7.891 | 9211. | .9596 | .9920 | .9634 | 29.72 | .3136 | .001067 |
| 2.208 | 8.039 | 9384. | .9611 | .9923 | .9648 | 29.76 | .2942 | .001092 |
| 2.247 | 8.182 | 9551. | .9650 | .9931 | .9684 | 29.88 | .2755 | .001115 |
| 2.273 | 8.274 | 9659. | .9662 | .9933 | .9694 | 29.91 | .2636 | .001130 |
| 2.310 | 8.409 | 9816. | .9673 | .9935 | .9704 | 29.94 | .2464 | .001152 |
| 2.339 | 8.515 | 9940. | .9702 | .9941 | .9731 | 30.03 | .2328 | .001169 |
| 2.373 | 8.640 | 10085. | .9738 | .9948 | .9763 | 30.13 | .2173 | .001189 |
| 2.411 | 8.778 | 10247. | .9756 | .9951 | .9780 | 30.18 | .2002 | .001210 |
| 2.435 | 8.866 | 10350. | .9769 | .9954 | .9791 | 30.22 | .1895 | .001223 |
| 2.523 | 9.185 | 10722. | .9820 | .9964 | .9838 | 30.37 | .1518 | .001270 |
| 2.556 | 9.305 | 10862. | .9825 | .9965 | .9842 | 30.38 | .1380 | .001287 |
| 2.593 | 9.439 | 11019. | .9856 | .9971 | .9870 | 30.47 | .1231 | .001305 |
| 2.626 | 9.560 | 11159. | .9863 | .9973 | .9877 | 30.49 | .1099 | .001321 |
| 2.669 | 9.717 | 11343. | .9890 | .9978 | .9901 | 30.57 | .0934 | .001341 |
| 2.719 | 9.897 | 11553. | .9909 | .9981 | .9918 | 30.62 | .0752 | .001363 |
| 2.768 | 10.077 | 11764. | .9916 | .9983 | .9924 | 30.64 | .0579 | .001384 |
| 2.806 | 10.216 | 11926. | .9926 | .9985 | .9933 | 30.67 | .0452 | .001400 |
| 2.842 | 10.346 | 12077. | .9937 | .9987 | .9943 | 30.70 | .0338 | .001413 |
| 2.887 | 10.517 | 12271. | .9957 | .9991 | .9961 | 30.76 | .0202 | .001430 |
| 2.923 | 10.641 | 12422. | .9961 | .9992 | .9965 | 30.77 | .0101 | .001442 |
| 2.997 | 10.910 | 12735. | .9976 | .9995 | .9978 | 30.82 | 0.0000 | .001454 |
| 3.042 | 11.076 | 12929. | .9974 | .9994 | .9977 | 30.81 | 0.0000 | .001454 |
| 3.115 | 11.339 | 13237. | .9976 | .9995 | .9978 | 30.82 | 0.0000 | .001454 |
| 3.187 | 11.603 | 13545. | .9989 | .9997 | .9990 | 30.85 | 0.0000 | .001454 |
| 3.274 | 11.917 | 13911. | .9981 | .9996 | .9983 | 30.83 | 0.0000 | .001454 |
| 3.351 | 12.199 | 14241. | .9992 | .9998 | .9993 | 30.86 | 0.0000 | .001454 |
| 3.435 | 12.504 | 14597. | 1.0007 | 1.0001 | 1.0006 | 30.91 | 0.0000 | .001454 |
| 3.525 | 12.833 | 14980. | 1.0005 | 1.0001 | 1.0005 | 30.90 | 0.0000 | .001454 |
| 3.604 | 13.119 | 15315. | .9991 | .9998 | .9992 | 30.86 | 0.0000 | .001454 |
| 3.649 | 13.286 | 15509. | 1.0000 | 1.0000 | 1.0000 | 30.89 | 0.0000 | .001454 |
| 3.683 | 13.406 | 15649. | .9996 | .9999 | .9997 | 30.88 | 0.0000 | .001454 |

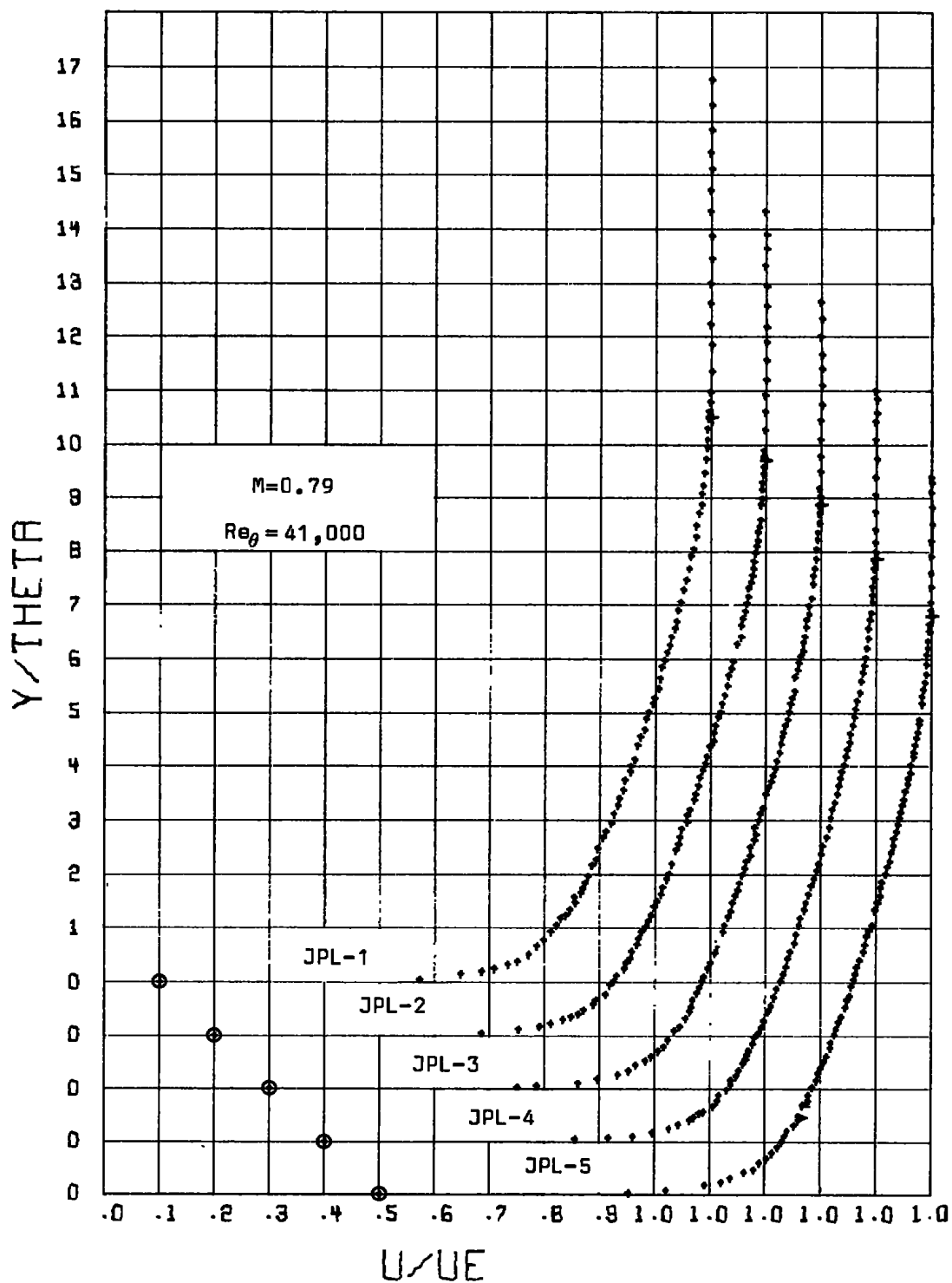


Figure A17. Mean Velocity Profiles.

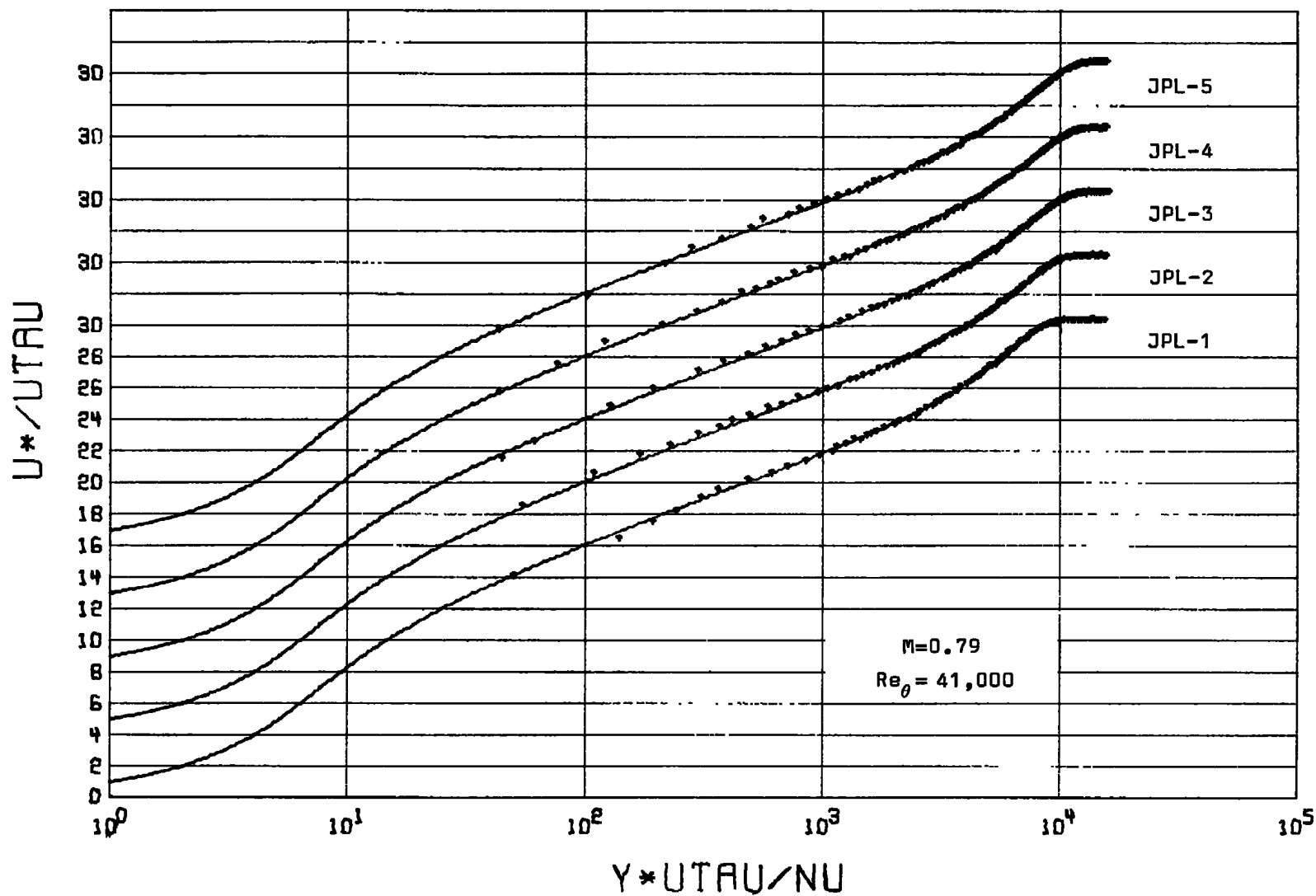


Figure A18. Van Driest Scaled Mean Velocity Profiles.

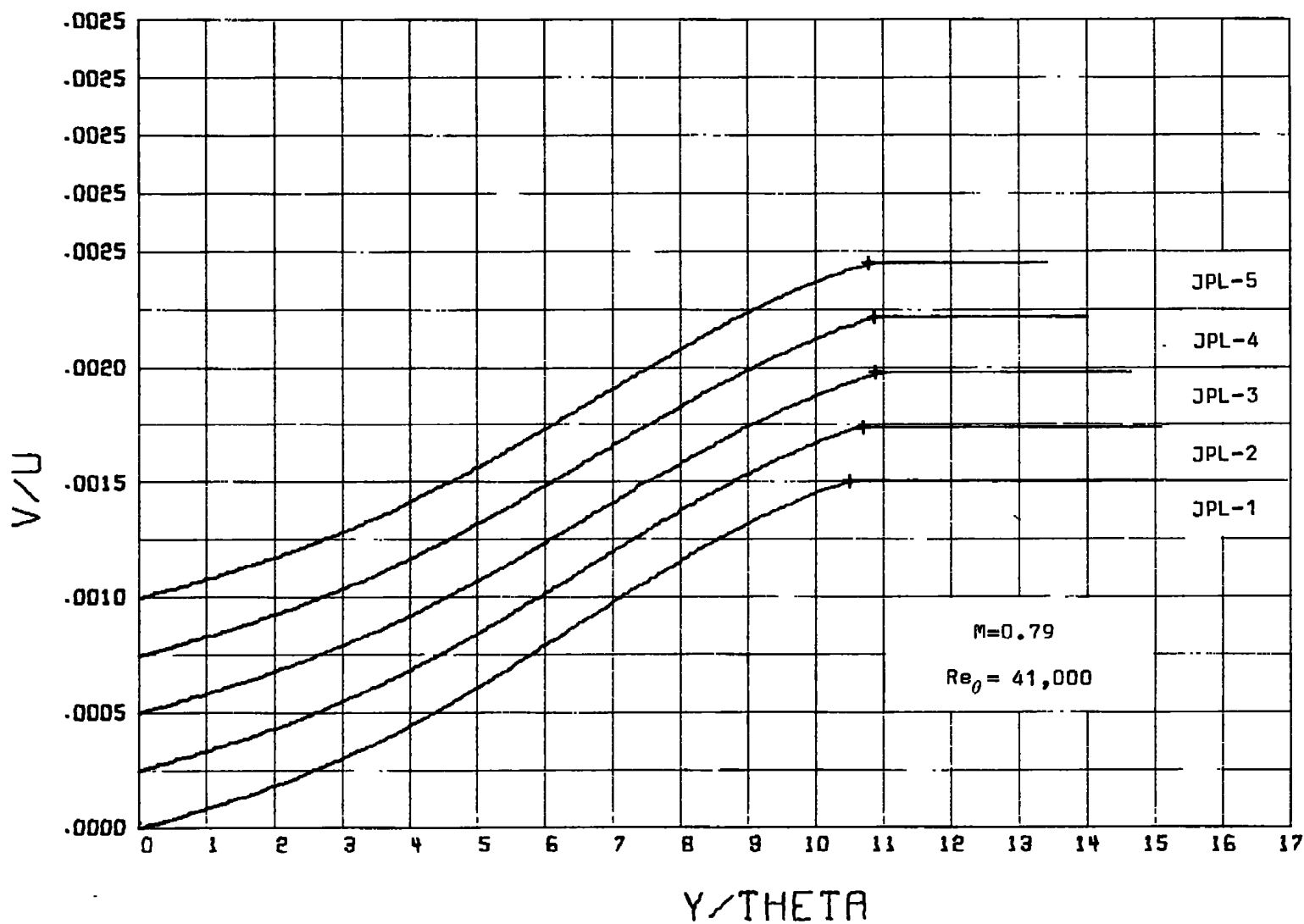


Figure A19. Normal Velocity Distribution.

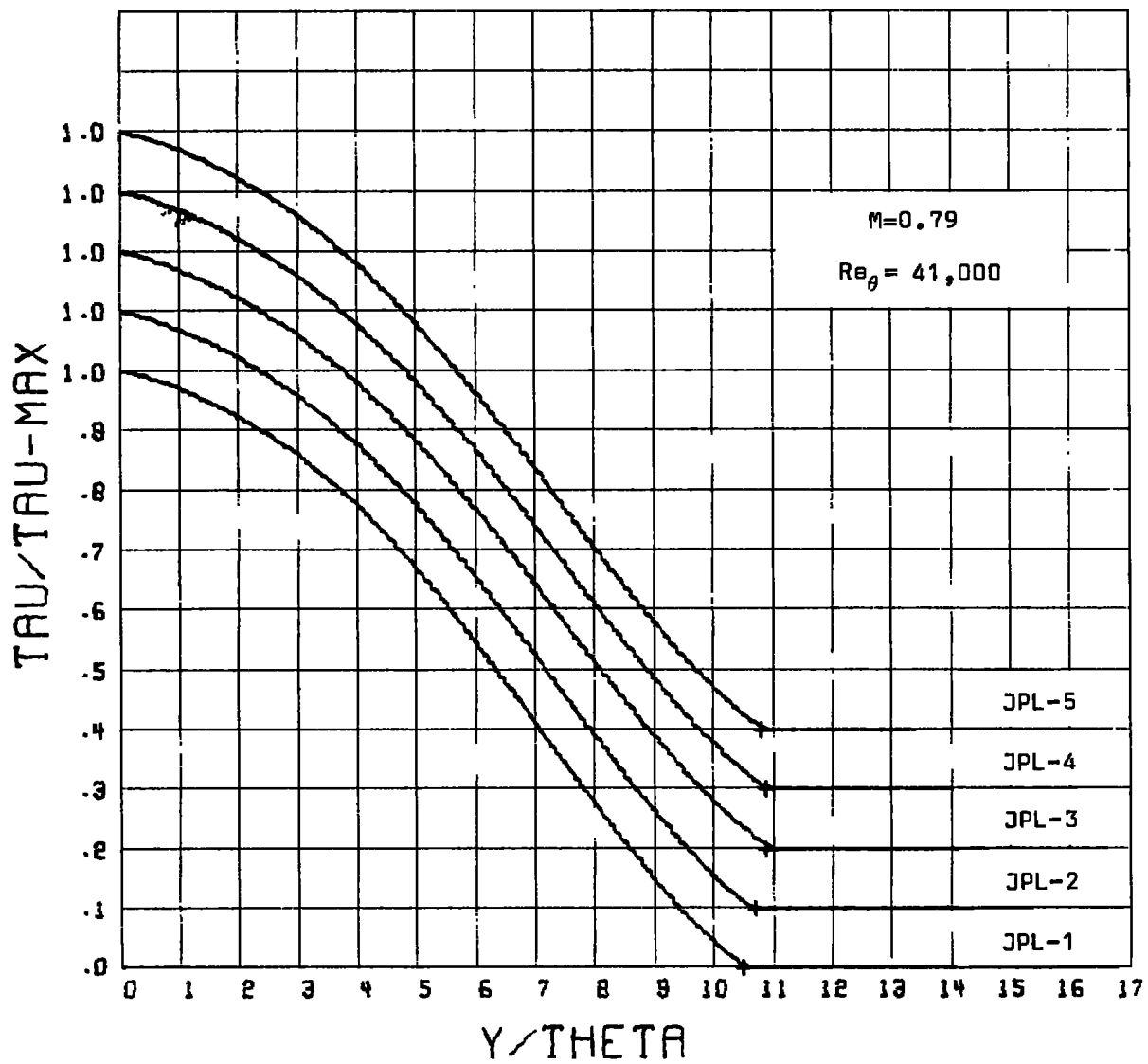


Figure A20. Shear Stress Distribution.

TABLE A 9. DATA SUMMARY
 PROFILE - JPL-1 - - - PITOT PRESSURE DATA

EDGE MACH NO.= .9664 TOTAL PRESSURE= .6611E+05 N/M**2
 X=-48.43 CM TOTAL TEMPERATURE= 310.59 DEG-K

UE= 313.76 M/SEC DELTA STAR= .3487 CM THETA= .2079 CM H= 1.677
 RE-DELTA-STAR= 31290. RE-THETA= 18650. NUWALL= .4564 CM**2/SEC
 LEAST SQUARE FIT PARAMETERS
 UTAU= 10.9979 M/SEC CF= .002108 PI= .7057 DELTA= 2.1042 CM
 CHISQR= .2873E-05 YMAX= 1.991 CM YMIN= .081 CM

| Y (CM) | Y/THETA | Y-PLUS | M/ME | RHO/RHOE | U/UE | U-PLUS | TAU/TAU-MAX | V/U |
|--------|---------|--------|--------|----------|--------|--------|-------------|----------|
| 0.000 | 0.000 | 0. | 0.0000 | .8581 | 0.0000 | 0.00 | 1.0000 | 0.000000 |
| .010 | .048 | 24. | .3807 | .8787 | .4061 | 11.63 | 1.0000 | 0.000000 |
| .019 | .091 | 45. | .4635 | .8886 | .4917 | 14.11 | .9992 | .000004 |
| .045 | .219 | 110. | .5480 | .9007 | .5774 | 16.60 | .9966 | .000016 |
| .062 | .299 | 149. | .5696 | .9041 | .5990 | 17.23 | .9946 | .000023 |
| .081 | .390 | 195. | .5903 | .9075 | .6197 | 17.84 | .9922 | .000032 |
| .092 | .445 | 223. | .6072 | .9104 | .6364 | 18.33 | .9906 | .000037 |
| .118 | .567 | 284. | .6248 | .9135 | .6537 | 18.84 | .9869 | .000049 |
| .143 | .690 | 345. | .6433 | .9168 | .6718 | 19.37 | .9829 | .000061 |
| .161 | .775 | 388. | .6527 | .9185 | .6810 | 19.64 | .9799 | .000070 |
| .195 | .940 | 471. | .6687 | .9215 | .6966 | 20.10 | .9739 | .000086 |
| .227 | 1.093 | 547. | .6839 | .9244 | .7112 | 20.54 | .9680 | .000102 |
| .269 | 1.294 | 648. | .6985 | .9273 | .7254 | 20.96 | .9595 | .000124 |
| .293 | 1.410 | 706. | .7046 | .9285 | .7312 | 21.13 | .9543 | .000137 |
| .327 | 1.575 | 789. | .7151 | .9306 | .7413 | 21.43 | .9466 | .000156 |
| .356 | 1.715 | 859. | .7265 | .9330 | .7521 | 21.75 | .9396 | .000172 |
| .388 | 1.848 | 936. | .7346 | .9347 | .7598 | 21.98 | .9316 | .000191 |
| .416 | 2.002 | 1003. | .7390 | .9356 | .7640 | 22.11 | .9242 | .000208 |
| .455 | 2.192 | 1098. | .7516 | .9382 | .7759 | 22.46 | .9132 | .000232 |
| .481 | 2.314 | 1159. | .7567 | .9393 | .7807 | 22.60 | .9057 | .000249 |
| .521 | 2.509 | 1257. | .7637 | .9408 | .7873 | 22.80 | .8930 | .000276 |
| .557 | 2.681 | 1343. | .7748 | .9433 | .7977 | 23.11 | .8813 | .000301 |
| .589 | 2.833 | 1419. | .7805 | .9445 | .8031 | 23.27 | .8702 | .000324 |
| .623 | 2.998 | 1502. | .7871 | .9460 | .8092 | 23.46 | .8577 | .000350 |
| .655 | 3.151 | 1579. | .7952 | .9478 | .8168 | 23.68 | .8455 | .000375 |
| .697 | 3.342 | 1680. | .8013 | .9492 | .8224 | 23.85 | .8286 | .000408 |
| .732 | 3.523 | 1765. | .8151 | .9523 | .8352 | 24.24 | .8136 | .000438 |
| .781 | 3.755 | 1881. | .8233 | .9543 | .8428 | 24.46 | .7920 | .000479 |
| .811 | 3.902 | 1955. | .8275 | .9552 | .8467 | 24.58 | .7776 | .000507 |
| .844 | 4.061 | 2035. | .8345 | .9569 | .8531 | 24.77 | .7616 | .000537 |
| .887 | 4.269 | 2139. | .8429 | .9589 | .8608 | 25.01 | .7397 | .000577 |
| .943 | 4.537 | 2273. | .8539 | .9615 | .8708 | 25.31 | .7098 | .000631 |
| .991 | 4.769 | 2389. | .8609 | .9632 | .8771 | 25.50 | .6828 | .000679 |
| 1.043 | 5.020 | 2515. | .8719 | .9660 | .8871 | 25.80 | .6523 | .000733 |
| 1.098 | 5.282 | 2647. | .8828 | .9687 | .8970 | 26.10 | .6190 | .000790 |
| 1.167 | 5.612 | 2812. | .8925 | .9711 | .9056 | 26.36 | .5755 | .000863 |
| 1.207 | 5.807 | 2910. | .9002 | .9731 | .9126 | 26.57 | .5489 | .000908 |
| 1.256 | 6.040 | 3026. | .9089 | .9753 | .9204 | 26.81 | .5166 | .000960 |
| 1.318 | 6.339 | 3176. | .9198 | .9781 | .9300 | 27.10 | .4742 | .001029 |
| 1.393 | 6.650 | 3332. | .9268 | .9800 | .9362 | 27.29 | .4293 | .001100 |
| 1.436 | 6.907 | 3461. | .9352 | .9822 | .9436 | 27.52 | .3920 | .001158 |

| Y (CM) | Y/THETA | Y-PLUS | TABLE A 9. (CONT.) | | U/U _E | U-PLUS | TAU/TAU-MAX | V/U |
|--------|---------|--------|--------------------|----------|------------------|--------|-------------|---------|
| | | | M/ME | RHO/RHOF | | | | |
| 1.485 | 7.145 | 3580. | .9432 | .9843 | .9507 | 27.73 | .3573 | .001212 |
| 1.537 | 7.395 | 3705. | .9511 | .9864 | .9576 | 27.95 | .3211 | .001267 |
| 1.583 | 7.615 | 3816. | .9576 | .9882 | .9633 | 28.12 | .2896 | .001315 |
| 1.644 | 7.909 | 3963. | .9606 | .9890 | .9659 | 28.20 | .2483 | .001377 |
| 1.689 | 8.123 | 4070. | .9699 | .9916 | .9740 | 28.45 | .2189 | .001420 |
| 1.739 | 8.367 | 4192. | .9736 | .9926 | .9773 | 28.55 | .1864 | .001468 |
| 1.799 | 8.653 | 4336. | .9797 | .9943 | .9825 | 28.71 | .1498 | .001521 |
| 1.842 | 8.861 | 4440. | .9833 | .9953 | .9856 | 28.81 | .1246 | .001557 |
| 1.899 | 9.136 | 4578. | .9867 | .9962 | .9886 | 28.90 | .0933 | .001602 |
| 1.945 | 9.356 | 4688. | .9901 | .9972 | .9915 | 28.98 | .0700 | .001636 |
| 1.991 | 9.576 | 4798. | .9928 | .9979 | .9938 | 29.06 | .0484 | .001666 |
| 2.043 | 9.826 | 4924. | .9929 | .9980 | .9939 | 29.06 | .0262 | .001698 |
| 2.091 | 10.058 | 5040. | .9962 | .9989 | .9967 | 29.15 | .0081 | .001723 |
| 2.133 | 10.260 | 5141. | .9955 | .9987 | .9962 | 29.13 | 0.0000 | .001734 |
| 2.194 | 10.553 | 5288. | .9975 | .9993 | .9979 | 29.18 | 0.0000 | .001734 |
| 2.254 | 10.840 | 5431. | .9973 | .9992 | .9977 | 29.18 | 0.0000 | .001734 |
| 2.360 | 11.353 | 5689. | .9987 | .9996 | .9989 | 29.21 | 0.0000 | .001734 |
| 2.471 | 11.885 | 5955. | .9991 | .9997 | .9992 | 29.22 | 0.0000 | .001734 |
| 2.553 | 12.281 | 6154. | .9992 | .9998 | .9994 | 29.23 | 0.0000 | .001734 |
| 2.640 | 12.697 | 6362. | 1.0007 | 1.0002 | 1.0006 | 29.27 | 0.0000 | .001734 |
| 2.678 | 12.880 | 6454. | .9998 | .9999 | .9998 | 29.24 | 0.0000 | .001734 |
| 2.772 | 13.332 | 6680. | 1.0001 | 1.0000 | 1.0001 | 29.25 | 0.0000 | .001734 |
| 2.868 | 13.796 | 6913. | .9997 | .9999 | .9998 | 29.24 | 0.0000 | .001734 |
| 2.975 | 14.309 | 7170. | .9982 | .9995 | .9985 | 29.20 | 0.0000 | .001734 |
| 3.074 | 14.785 | 7408. | .9993 | .9998 | .9994 | 29.23 | 0.0000 | .001734 |
| 3.172 | 15.018 | 7525. | 1.0016 | 1.0004 | 1.0014 | 29.29 | 0.0000 | .001734 |
| 3.166 | 15.226 | 7629. | .9994 | .9998 | .9995 | 29.23 | 0.0000 | .001734 |
| 3.221 | 15.494 | 7763. | 1.0004 | 1.0001 | 1.0004 | 29.26 | 0.0000 | .001734 |
| 3.263 | 15.696 | 7865. | .9995 | .9998 | .9996 | 29.23 | 0.0000 | .001734 |
| 3.305 | 15.897 | 7966. | .9989 | .9997 | .9991 | 29.22 | 0.0000 | .001734 |
| 3.356 | 16.142 | 8088. | .9985 | .9995 | .9987 | 29.21 | 0.0000 | .001734 |
| 3.398 | 16.343 | 8189. | 1.0008 | 1.0002 | 1.0007 | 29.27 | 0.0000 | .001734 |
| 3.458 | 16.630 | 8333. | 1.0001 | 1.0000 | 1.0001 | 29.25 | 0.0000 | .001734 |

TABLE A 9. (CONT.)
 PROFILE - JPL-2 - - - PITOT PRESSURE DATA

EDGE MACH NO.= .9669 TOTAL PRESSURE= .6691E+05 N/M**2
 X=-76.71 CM TOTAL TEMPERATURE= 312.05 DEG-K

UE= 314.63 M/SFC DELTA STAR= .3983 CM THETA= .2385 CM H= 1.670
 RE-DELTA-STAR= 34900. RE-THETA= 20890. NUWALL= .4546 CM**2/SEC

LEAST SQUARE FIT PARAMETERS
 UTAU= 10.9169 M/SEC CF= .002065 PI= .6968 DELTA= 2.4307 CM
 CHISQR= .4764E-05 YMAX= 2.258 CM YMIN= .076 CM

| Y (CM) | Y/THETA | Y-PLUS | M/ME | RHO/RHOE | U/UE | U-PLUS | TAU/TAU-MAX | V/U |
|--------|---------|--------|--------|----------|--------|--------|-------------|----------|
| 0.000 | 0.000 | 0. | 0.0000 | .8580 | 0.0000 | 0.00 | 1.0000 | 0.000000 |
| .010 | .042 | 24. | .3734 | .8778 | .3986 | 11.53 | 1.0000 | 0.000000 |
| .011 | .047 | 27. | .3891 | .8795 | .4149 | 12.00 | .9999 | 0.000000 |
| .013 | .058 | 33. | .4342 | .8847 | .4616 | 13.37 | .9997 | .000001 |
| .024 | .101 | 57. | .4788 | .8905 | .5074 | 14.71 | .9989 | .000005 |
| .043 | .181 | 103. | .5340 | .8985 | .5633 | 16.36 | .9973 | .000013 |
| .058 | .244 | 140. | .5617 | .9028 | .5912 | 17.18 | .9958 | .000019 |
| .076 | .319 | 182. | .5862 | .9068 | .6156 | 17.90 | .9939 | .000025 |
| .097 | .410 | 234. | .6033 | .9096 | .6325 | 18.40 | .9913 | .000034 |
| .111 | .468 | 268. | .6128 | .9113 | .6420 | 18.68 | .9896 | .000039 |
| .124 | .521 | 298. | .6260 | .9136 | .6549 | 19.07 | .9880 | .000044 |
| .142 | .596 | 341. | .6333 | .9149 | .6621 | 19.28 | .9856 | .000051 |
| .172 | .724 | 414. | .6514 | .9182 | .6798 | 19.81 | .9813 | .000064 |
| .199 | .836 | 478. | .6605 | .9199 | .6887 | 20.07 | .9773 | .000074 |
| .223 | .937 | 536. | .6741 | .9225 | .7018 | 20.47 | .9736 | .000085 |
| .251 | 1.054 | 603. | .6852 | .9246 | .7126 | 20.79 | .9690 | .000096 |
| .287 | 1.203 | 689. | .6961 | .9268 | .7231 | 21.10 | .9629 | .000112 |
| .284 | 1.192 | 683. | .6951 | .9266 | .7221 | 21.07 | .9628 | .000112 |
| .308 | 1.293 | 741. | .6985 | .9272 | .7253 | 21.17 | .9590 | .000121 |
| .330 | 1.384 | 792. | .7048 | .9285 | .7314 | 21.35 | .9549 | .000131 |
| .360 | 1.512 | 866. | .7143 | .9304 | .7405 | 21.62 | .9490 | .000145 |
| .393 | 1.650 | 945. | .7201 | .9316 | .7460 | 21.79 | .9423 | .000161 |
| .424 | 1.778 | 1018. | .7309 | .9338 | .7563 | 22.10 | .9358 | .000176 |
| .462 | 1.938 | 1110. | .7396 | .9356 | .7646 | 22.35 | .9272 | .000195 |
| .490 | 2.055 | 1177. | .7463 | .9371 | .7709 | 22.54 | .9206 | .000210 |
| .516 | 2.167 | 1241. | .7534 | .9386 | .7776 | 22.74 | .9141 | .000224 |
| .556 | 2.332 | 1335. | .7568 | .9393 | .7809 | 22.84 | .9039 | .000246 |
| .582 | 2.444 | 1399. | .7647 | .9410 | .7883 | 23.06 | .8968 | .000261 |
| .599 | 2.513 | 1439. | .7711 | .9424 | .7943 | 23.25 | .8922 | .000270 |
| .626 | 2.625 | 1503. | .7735 | .9429 | .7966 | 23.31 | .8846 | .000286 |
| .661 | 2.774 | 1588. | .7837 | .9452 | .8061 | 23.60 | .8741 | .000308 |
| .693 | 2.864 | 1640. | .7821 | .9448 | .8046 | 23.56 | .8674 | .000321 |
| .728 | 3.056 | 1750. | .7938 | .9475 | .8155 | 23.89 | .8527 | .000350 |
| .748 | 3.136 | 1796. | .7967 | .9481 | .8182 | 23.97 | .8464 | .000363 |
| .779 | 3.269 | 1872. | .8018 | .9493 | .8230 | 24.11 | .8354 | .000384 |
| .828 | 3.471 | 1988. | .8127 | .9518 | .8330 | 24.42 | .8180 | .000418 |
| .868 | 3.642 | 2086. | .8214 | .9538 | .8411 | 24.66 | .8026 | .000447 |
| .905 | 3.796 | 2174. | .8251 | .9546 | .8445 | 24.77 | .7881 | .000474 |
| .949 | 3.983 | 2281. | .8306 | .9559 | .8495 | 24.92 | .7697 | .000508 |
| .989 | 4.148 | 2375. | .8370 | .9575 | .8554 | 25.10 | .7529 | .000539 |
| 1.036 | 4.345 | 2488. | .8487 | .9602 | .8661 | 25.42 | .7319 | .000576 |

| Y (CM) | Y/THETA | Y-PLUS | TABLE A 9. (CONT.) M/ME | RHO/RHOF | U/UF | U-PLUS | TAU/TAU-MAX | V/U |
|--------|---------|--------|----------------------------|----------|--------|--------|-------------|---------|
| 1.099 | 4.568 | 2616. | .8564 | .9621 | .8731 | 25.64 | .7070 | .000620 |
| 1.126 | 4.723 | 2705. | .8590 | .9628 | .8755 | 25.71 | .6892 | .000651 |
| 1.173 | 4.920 | 2818. | .8678 | .9649 | .8834 | 25.95 | .6657 | .000692 |
| 1.200 | 5.069 | 2903. | .8751 | .9667 | .8901 | 26.16 | .6474 | .000723 |
| 1.252 | 5.250 | 3007. | .8803 | .9680 | .8947 | 26.30 | .6247 | .000761 |
| 1.297 | 5.442 | 3116. | .8871 | .9697 | .9008 | 26.48 | .5999 | .000802 |
| 1.336 | 5.601 | 3208. | .8929 | .9712 | .9060 | 26.64 | .5787 | .000837 |
| 1.367 | 5.734 | 3284. | .9008 | .9732 | .9131 | 26.86 | .5609 | .000866 |
| 1.404 | 5.889 | 3373. | .9034 | .9739 | .9154 | 26.93 | .5399 | .000900 |
| 1.430 | 5.995 | 3434. | .9061 | .9745 | .9178 | 27.01 | .5257 | .000924 |
| 1.465 | 6.144 | 3519. | .9132 | .9764 | .9241 | 27.20 | .5044 | .000957 |
| 1.494 | 6.267 | 3589. | .9165 | .9772 | .9271 | 27.29 | .4871 | .000984 |
| 1.530 | 6.416 | 3675. | .9203 | .9787 | .9304 | 27.39 | .4659 | .001017 |
| 1.579 | 6.624 | 3793. | .9290 | .9805 | .9382 | 27.63 | .4361 | .001063 |
| 1.633 | 6.847 | 3922. | .9348 | .9821 | .9433 | 27.79 | .4038 | .001113 |
| 1.685 | 7.066 | 4047. | .9414 | .9838 | .9491 | 27.97 | .3722 | .001161 |
| 1.744 | 7.316 | 4190. | .9450 | .9848 | .9522 | 28.07 | .3360 | .001216 |
| 1.789 | 7.502 | 4297. | .9545 | .9874 | .9606 | 28.33 | .3092 | .001255 |
| 1.849 | 7.753 | 4440. | .9576 | .9882 | .9633 | 28.41 | .2732 | .001308 |
| 1.892 | 7.934 | 4544. | .9621 | .9894 | .9672 | 28.53 | .2484 | .001345 |
| 1.948 | 8.168 | 4678. | .9708 | .9918 | .9748 | 28.76 | .2163 | .001391 |
| 2.000 | 8.386 | 4803. | .9708 | .9918 | .9748 | 28.76 | .1877 | .001433 |
| 2.061 | 8.642 | 4949. | .9780 | .9938 | .9810 | 28.96 | .1545 | .001480 |
| 2.115 | 8.871 | 5081. | .9821 | .9949 | .9846 | 29.07 | .1264 | .001520 |
| 2.166 | 9.084 | 5202. | .9836 | .9954 | .9859 | 29.11 | .1017 | .001554 |
| 2.212 | 9.276 | 5312. | .9882 | .9966 | .9898 | 29.23 | .0806 | .001584 |
| 2.258 | 9.467 | 5422. | .9898 | .9971 | .9913 | 29.28 | .0607 | .001612 |
| 2.311 | 9.691 | 5550. | .9898 | .9971 | .9912 | 29.27 | .0393 | .001642 |
| 2.358 | 9.888 | 5663. | .9943 | .9983 | .9951 | 29.39 | .0220 | .001665 |
| 2.402 | 10.074 | 5770. | .9934 | .9981 | .9943 | 29.37 | .0072 | .001686 |
| 2.448 | 10.266 | 5880. | .9946 | .9984 | .9953 | 29.40 | 0.0000 | .001696 |
| 2.493 | 10.452 | 5986. | .9965 | .9990 | .9970 | 29.45 | 0.0000 | .001696 |
| 2.539 | 10.852 | 6215. | .9978 | .9993 | .9991 | 29.49 | 0.0000 | .001696 |
| 2.669 | 11.193 | 6410. | .9988 | .9996 | .9999 | 29.51 | 0.0000 | .001696 |
| 2.759 | 11.571 | 6627. | 1.0003 | 1.0000 | 1.0002 | 29.55 | 0.0000 | .001696 |
| 2.844 | 11.927 | 6831. | .9980 | .9994 | .9983 | 29.49 | 0.0000 | .001696 |
| 2.931 | 12.289 | 7038. | .9985 | .9996 | .9987 | 29.51 | 0.0000 | .001696 |
| 3.011 | 12.625 | 7231. | .9986 | .9996 | .9988 | 29.51 | 0.0000 | .001696 |
| 3.083 | 12.928 | 7404. | .9986 | .9996 | .9988 | 29.51 | 0.0000 | .001696 |
| 3.154 | 13.227 | 7575. | .9986 | .9996 | .9988 | 29.51 | 0.0000 | .001696 |
| 3.239 | 13.583 | 7780. | 1.0001 | 1.0000 | 1.0000 | 29.55 | 0.0000 | .001696 |
| 3.309 | 13.876 | 7947. | .9993 | .9998 | .9994 | 29.53 | 0.0000 | .001696 |
| 3.350 | 14.047 | 8045. | 1.0001 | 1.0000 | 1.0000 | 29.55 | 0.0000 | .001696 |
| 3.389 | 14.212 | 8139. | .9999 | .9999 | .9999 | 29.54 | 0.0000 | .001696 |
| 3.427 | 14.372 | 8231. | 1.0001 | 1.0000 | 1.0000 | 29.55 | 0.0000 | .001696 |
| 3.455 | 14.489 | 8298. | .9997 | .9999 | .9997 | 29.54 | 0.0000 | .001696 |
| 3.548 | 14.877 | 8521. | 1.0001 | 1.0000 | 1.0000 | 29.55 | 0.0000 | .001696 |

TABLE A 9. (CONT.)
 PROFILE - JPL-3 - - - PITOT PRESSURE DATA

EDGE MACH NO.= .9719 TOTAL PRESSURE= .6638E+05 N/M**2
 X= -7.62 CM TOTAL TEMPERATURE= 309.38 DEG-K

UE= 314.66 M/SEC DELTA STAR= .4084 CM THETA= .2466 CM H= 1.656
 RE-Delta-STAR= 37630. RE-THETA= 22720. NUWALL= .4531 CM**2/SEC

LEAST SQUARE FIT PARAMETERS
 UTAU= 11.0079 M/SEC CF= .002097 PI= .4076 DELTA= 2.6090 CM
 CHISQR= .7695E-05 YMAX= 2.454 CM YMIN= .077 CM

| Y (CM) | Y/THETA | Y-PLUS | M/ME | RHO/RHNE | U/UF | H-PLUS | TAU/TAU-MAX | V/U |
|--------|---------|--------|--------|----------|--------|--------|-------------|----------|
| 0.000 | 0.000 | 0. | 0.0000 | .8567 | 0.0000 | 0.00 | 1.0000 | 0.000000 |
| .010 | .041 | 24. | .4100 | .8808 | .4369 | 12.54 | 1.0000 | 0.000000 |
| .012 | .051 | 30. | .4158 | .8815 | .4429 | 12.72 | .9998 | .000001 |
| .016 | .066 | 40. | .4736 | .8888 | .5023 | 14.44 | .9995 | .000002 |
| .027 | .113 | 67. | .5165 | .8949 | .5460 | 15.72 | .9986 | .000007 |
| .038 | .154 | 92. | .5444 | .8992 | .5741 | 16.54 | .9978 | .000011 |
| .053 | .214 | 129. | .5602 | .9017 | .5900 | 17.00 | .9963 | .000016 |
| .063 | .257 | 154. | .5752 | .9041 | .6049 | 17.44 | .9953 | .000020 |
| .077 | .314 | 188. | .5930 | .9071 | .6227 | 17.96 | .9937 | .000026 |
| .088 | .360 | 215. | .6078 | .9096 | .6373 | 18.39 | .9924 | .000030 |
| .104 | .422 | 253. | .6170 | .9117 | .6463 | 18.66 | .9906 | .000036 |
| .125 | .509 | 305. | .6283 | .9133 | .6574 | 18.99 | .9879 | .000044 |
| .144 | .587 | 351. | .6443 | .9162 | .6732 | 19.45 | .9854 | .000052 |
| .166 | .674 | 404. | .6561 | .9184 | .6846 | 19.79 | .9824 | .000060 |
| .186 | .757 | 453. | .6647 | .9200 | .6930 | 20.04 | .9795 | .000068 |
| .207 | .839 | 502. | .6742 | .9218 | .7022 | 20.31 | .9765 | .000077 |
| .220 | .896 | 536. | .6818 | .9233 | .7095 | 20.53 | .9743 | .000082 |
| .245 | .993 | 595. | .6855 | .9240 | .7131 | 20.64 | .9705 | .000092 |
| .257 | 1.045 | 626. | .6899 | .9249 | .7174 | 20.76 | .9685 | .000098 |
| .293 | 1.189 | 712. | .7012 | .9271 | .7282 | 21.09 | .9625 | .000113 |
| .327 | 1.328 | 796. | .7146 | .9299 | .7411 | 21.47 | .9564 | .000127 |
| .360 | 1.462 | 876. | .7271 | .9314 | .7482 | 21.68 | .9503 | .000142 |
| .388 | 1.575 | 944. | .7295 | .9329 | .7553 | 21.89 | .9449 | .000155 |
| .417 | 1.694 | 1015. | .7354 | .9342 | .7608 | 22.06 | .9391 | .000168 |
| .449 | 1.823 | 1092. | .7386 | .9348 | .7639 | 22.15 | .9324 | .000183 |
| .476 | 1.931 | 1157. | .7447 | .9361 | .7696 | 22.32 | .9267 | .000196 |
| .501 | 2.034 | 1218. | .7541 | .9382 | .7786 | 22.59 | .9210 | .000209 |
| .539 | 2.188 | 1311. | .7577 | .9389 | .7819 | 22.69 | .9122 | .000228 |
| .577 | 2.343 | 1403. | .7637 | .9403 | .7876 | 22.86 | .9029 | .000248 |
| .610 | 2.477 | 1484. | .7763 | .9430 | .7994 | 23.21 | .8945 | .000265 |
| .650 | 2.636 | 1579. | .7802 | .9439 | .8031 | 23.32 | .8841 | .000287 |
| .679 | 2.755 | 1650. | .7856 | .9451 | .8091 | 23.47 | .8760 | .000303 |
| .718 | 2.914 | 1746. | .7898 | .9461 | .8170 | 23.59 | .8648 | .000326 |
| .755 | 3.064 | 1835. | .7975 | .9478 | .8191 | 23.80 | .8538 | .000348 |
| .783 | 3.177 | 1903. | .7992 | .9482 | .8207 | 23.85 | .8451 | .000365 |
| .829 | 3.362 | 2014. | .8108 | .9509 | .8314 | 24.17 | .8305 | .000394 |
| .867 | 3.517 | 2107. | .8169 | .9523 | .8371 | 24.34 | .8177 | .000419 |
| .899 | 3.646 | 2184. | .8237 | .9539 | .8433 | 24.53 | .8067 | .000440 |
| .941 | 3.816 | 2286. | .8286 | .9551 | .8478 | 24.67 | .7916 | .000468 |
| .979 | 3.970 | 2378. | .8344 | .9564 | .8532 | 24.83 | .7774 | .000494 |
| 1.017 | 4.125 | 2471. | .8395 | .9577 | .8578 | 24.97 | .7627 | .000521 |

| Y (CM) | Y/THETA | Y-PLUS | TABLE A 9. (CONT.) M/ME | RHO/RHOF | U/UE | U-PLUS | TAU/TAU-MAX | V/U |
|--------|---------|--------|----------------------------|----------|--------|--------|-------------|---------|
| 1.061 | 4.305 | 2579. | .8465 | .9594 | .8643 | 25.16 | .7449 | .000554 |
| 1.103 | 4.475 | 2681. | .8538 | .9611 | .8709 | 25.36 | .7275 | .000585 |
| 1.130 | 4.583 | 2746. | .8570 | .9619 | .8737 | 25.45 | .7162 | .000605 |
| 1.165 | 4.727 | 2832. | .8609 | .9629 | .8773 | 25.56 | .7007 | .000632 |
| 1.198 | 4.861 | 2912. | .8670 | .9644 | .8829 | 25.73 | .6860 | .000658 |
| 1.240 | 5.031 | 3014. | .8710 | .9654 | .8845 | 25.84 | .6668 | .000691 |
| 1.268 | 5.144 | 3082. | .8783 | .9677 | .8930 | 26.04 | .6537 | .000714 |
| 1.310 | 5.314 | 3184. | .8785 | .9673 | .8937 | 26.04 | .6337 | .000748 |
| 1.341 | 5.438 | 3258. | .8874 | .9695 | .9012 | 26.29 | .6189 | .000773 |
| 1.377 | 5.587 | 3347. | .8898 | .9701 | .9034 | 26.35 | .6006 | .000804 |
| 1.410 | 5.721 | 3427. | .8951 | .9715 | .9081 | 26.50 | .5839 | .000832 |
| 1.456 | 5.907 | 3538. | .9035 | .9736 | .9156 | 26.72 | .5604 | .000870 |
| 1.497 | 6.071 | 3637. | .9072 | .9744 | .9189 | 26.83 | .5392 | .000905 |
| 1.527 | 6.195 | 3711. | .9118 | .9758 | .9230 | 26.95 | .5230 | .000931 |
| 1.560 | 6.329 | 3791. | .9157 | .9768 | .9265 | 27.06 | .5053 | .000960 |
| 1.611 | 6.535 | 3915. | .9202 | .9780 | .9304 | 27.18 | .4778 | .001003 |
| 1.647 | 6.679 | 4001. | .9258 | .9795 | .9355 | 27.33 | .4584 | .001034 |
| 1.675 | 6.792 | 4069. | .9284 | .9802 | .9377 | 27.40 | .4430 | .001058 |
| 1.714 | 6.952 | 4165. | .9353 | .9820 | .9438 | 27.58 | .4212 | .001092 |
| 1.751 | 7.101 | 4254. | .9370 | .9825 | .9453 | 27.63 | .4007 | .001124 |
| 1.781 | 7.225 | 4328. | .9395 | .9837 | .9475 | 27.70 | .3838 | .001150 |
| 1.817 | 7.369 | 4415. | .9441 | .9844 | .9516 | 27.82 | .3640 | .001181 |
| 1.859 | 7.539 | 4517. | .9485 | .9856 | .9554 | 27.94 | .3407 | .001216 |
| 1.903 | 7.719 | 4625. | .9534 | .9869 | .9597 | 28.07 | .3161 | .001253 |
| 1.934 | 7.843 | 4699. | .9554 | .9875 | .9614 | 28.13 | .2993 | .001279 |
| 1.972 | 7.998 | 4791. | .9580 | .9882 | .9637 | 28.20 | .2784 | .001310 |
| 2.028 | 8.224 | 4927. | .9663 | .9905 | .9709 | 28.42 | .2483 | .001355 |
| 2.066 | 8.379 | 5019. | .9690 | .9912 | .9733 | 28.49 | .2280 | .001384 |
| 2.108 | 8.549 | 5121. | .9726 | .9922 | .9764 | 28.58 | .2061 | .001417 |
| 2.142 | 8.688 | 5205. | .9743 | .9927 | .9779 | 28.63 | .1885 | .001442 |
| 2.190 | 8.842 | 5297. | .9752 | .9930 | .9786 | 28.65 | .1693 | .001470 |
| 2.212 | 8.971 | 5374. | .9813 | .9947 | .9839 | 28.82 | .1537 | .001493 |
| 2.256 | 9.151 | 5482. | .9826 | .9950 | .9850 | 28.85 | .1324 | .001523 |
| 2.296 | 9.311 | 5578. | .9841 | .9955 | .9863 | 28.89 | .1141 | .001550 |
| 2.334 | 9.445 | 5671. | .9860 | .9960 | .9879 | 28.94 | .0967 | .001575 |
| 2.381 | 9.656 | 5785. | .9870 | .9963 | .9888 | 28.97 | .0769 | .001603 |
| 2.413 | 9.785 | 5862. | .9910 | .9974 | .9923 | 29.07 | .0639 | .001621 |
| 2.454 | 9.955 | 5964. | .9925 | .9978 | .9936 | 29.11 | .0475 | .001644 |
| 2.498 | 10.130 | 6069. | .9931 | .9980 | .9940 | 29.13 | .0315 | .001667 |
| 2.538 | 10.294 | 6167. | .9957 | .9986 | .9958 | 29.18 | .0175 | .001687 |
| 2.574 | 10.439 | 6254. | .9952 | .9986 | .9958 | 29.18 | .0060 | .001703 |
| 2.616 | 10.609 | 6355. | .9960 | .9988 | .9966 | 29.21 | 0.0000 | .001711 |
| 2.665 | 10.809 | 6476. | .9965 | .9990 | .9970 | 29.22 | 0.0000 | .001711 |
| 2.735 | 11.093 | 6645. | .9994 | .9998 | .9995 | 29.30 | 0.0000 | .001711 |
| 2.820 | 11.438 | 6852. | .9989 | .9996 | .9990 | 29.28 | 0.0000 | .001711 |
| 2.917 | 11.829 | 7087. | .9989 | .9996 | .9990 | 29.28 | 0.0000 | .001711 |
| 3.011 | 12.210 | 7315. | .9996 | .9999 | .9997 | 29.30 | 0.0000 | .001711 |
| 3.097 | 12.560 | 7525. | 1.0009 | 1.0002 | 1.0008 | 29.34 | 0.0000 | .001711 |
| 3.191 | 12.942 | 7753. | 1.0014 | 1.0004 | 1.0012 | 29.35 | 0.0000 | .001711 |
| 3.294 | 13.359 | 8003. | .9998 | .9999 | .9998 | 29.31 | 0.0000 | .001711 |
| 3.392 | 13.755 | 8241. | .9990 | .9997 | .9991 | 29.28 | 0.0000 | .001711 |
| 3.442 | 13.961 | 8364. | 1.0006 | 1.0001 | 1.0005 | 29.33 | 0.0000 | .001711 |
| 3.498 | 14.188 | 8500. | 1.0011 | 1.0003 | 1.0009 | 29.34 | 0.0000 | .001711 |
| 3.552 | 14.404 | 8629. | .9990 | .9997 | .9991 | 29.28 | 0.0000 | .001711 |
| 3.549 | 14.554 | 8719. | 1.0001 | 1.0000 | 1.0001 | 29.31 | 0.0000 | .001711 |
| 3.641 | 14.765 | 8845. | .9997 | .9999 | .9998 | 29.30 | 0.0000 | .001711 |

TABLE A 9. (CONT.)
 PROFILE - JPL-4 - - - PITOT PRESSURE DATA

EDGE MACH NO.= .9672 TOTAL PRESSURE= .6665E+05 N/M**2
 X= 0.00 CM TOTAL TEMPERATURE= 312.77 DEG-K

UE= 315.09 M/SEC DELTA STAR= .4228 CM THETA= .2556 CM H= 1.653
 RE-DELTA-STAR= 37790. RE-THETA= 22840. NUWALL= .4571 CM**2/SEC CF= .002057

LEAST SQUARE FIT PARAMETERS
 UTAU= 10.9744 M/SEC CF= .002081 PI= .6222 DELTA= 2.6964 CM
 CHISQR= .6317E-05 YMAX= 2.538 CM YMIN= .074 CM

| Y (CM) | Y/THETA | Y-PLUS | M/ME | RHO/RHOF | U/UE | U-PLUS | TAU/TAU-MAX | V/U |
|--------|---------|--------|--------|----------|--------|--------|-------------|----------|
| 0.000 | 0.000 | 0. | 0.0000 | .8579 | 0.0000 | 0.00 | 1.0000 | 0.000000 |
| .010 | .039 | 24. | .4037 | .8810 | .4300 | 12.40 | 1.0000 | 0.000000 |
| .011 | .044 | 27. | .4269 | .8838 | .4541 | 13.10 | .9999 | 0.000000 |
| .026 | .104 | 64. | .5148 | .8955 | .5440 | 15.73 | .9988 | .000006 |
| .052 | .203 | 125. | .5643 | .9031 | .5938 | 17.19 | .9967 | .000015 |
| .074 | .293 | 179. | .5847 | .9065 | .6142 | 17.79 | .9944 | .000023 |
| .092 | .362 | 227. | .6092 | .9106 | .6383 | 18.51 | .9925 | .000030 |
| .118 | .462 | 283. | .6266 | .9137 | .6555 | 19.01 | .9896 | .000039 |
| .140 | .551 | 338. | .6365 | .9155 | .6653 | 19.30 | .9868 | .000047 |
| .158 | .620 | 381. | .6396 | .9160 | .6682 | 19.39 | .9845 | .000054 |
| .170 | .665 | 408. | .6526 | .9184 | .6810 | 19.77 | .9830 | .000058 |
| .207 | .809 | 497. | .6688 | .9214 | .6968 | 20.24 | .9780 | .000072 |
| .224 | .879 | 539. | .6748 | .9226 | .7026 | 20.41 | .9754 | .000079 |
| .240 | .938 | 576. | .6801 | .9236 | .7076 | 20.56 | .9731 | .000085 |
| .260 | 1.018 | 625. | .6887 | .9253 | .7159 | 20.81 | .9701 | .000093 |
| .283 | 1.107 | 679. | .6921 | .9259 | .7192 | 20.91 | .9665 | .000102 |
| .293 | 1.147 | 704. | .7011 | .9277 | .7279 | 21.17 | .9648 | .000106 |
| .341 | 1.336 | 820. | .7100 | .9295 | .7364 | 21.42 | .9568 | .000125 |
| .370 | 1.450 | 890. | .7165 | .9308 | .7426 | 21.61 | .9516 | .000138 |
| .406 | 1.589 | 975. | .7286 | .9333 | .7542 | 21.95 | .9451 | .000153 |
| .443 | 1.733 | 1064. | .7398 | .9356 | .7648 | 22.27 | .9380 | .000169 |
| .485 | 1.897 | 1164. | .7453 | .9368 | .7700 | 22.43 | .9295 | .000188 |
| .519 | 2.031 | 1247. | .7549 | .9389 | .7791 | 22.70 | .9223 | .000204 |
| .561 | 2.195 | 1347. | .7585 | .9396 | .7825 | 22.80 | .9130 | .000224 |
| .590 | 2.310 | 1417. | .7632 | .9407 | .7869 | 22.94 | .9062 | .000238 |
| .624 | 2.444 | 1500. | .7725 | .9427 | .7957 | 23.20 | .8980 | .000256 |
| .654 | 2.558 | 1570. | .7771 | .9437 | .8000 | 23.33 | .8907 | .000271 |
| .688 | 2.692 | 1652. | .7848 | .9454 | .8071 | 23.54 | .8818 | .000289 |
| .727 | 2.846 | 1747. | .7901 | .9466 | .8121 | 23.69 | .8712 | .000310 |
| .764 | 2.990 | 1835. | .7921 | .9470 | .8139 | 23.75 | .8609 | .000331 |
| .802 | 3.139 | 1927. | .7987 | .9485 | .8201 | 23.93 | .8498 | .000353 |
| .833 | 3.258 | 2000. | .8052 | .9500 | .8261 | 24.12 | .8406 | .000371 |
| .877 | 3.432 | 2104. | .8136 | .9519 | .8338 | 24.35 | .8266 | .000398 |
| .915 | 3.581 | 2198. | .8178 | .9529 | .8378 | 24.47 | .8141 | .000421 |
| .951 | 3.720 | 2283. | .8262 | .9549 | .8455 | 24.70 | .8021 | .000444 |
| .988 | 3.865 | 2372. | .8314 | .9561 | .8502 | 24.85 | .7892 | .000468 |
| 1.023 | 4.004 | 2457. | .8340 | .9567 | .8526 | 24.92 | .7763 | .000492 |
| 1.061 | 4.153 | 2549. | .8408 | .9583 | .8589 | 25.11 | .7621 | .000518 |
| 1.096 | 4.287 | 2631. | .8459 | .9595 | .8635 | 25.25 | .7489 | .000541 |
| 1.134 | 4.436 | 2722. | .8531 | .9613 | .8701 | 25.45 | .7338 | .000568 |
| 1.164 | 4.555 | 2796. | .8570 | .9622 | .8737 | 25.56 | .7214 | .000590 |

| Y (CM) | Y/THFTA | Y-PLUS | TABLE A 9. (CONT.) M/ME | RHO/RH0E | U/UE | U-PLUS | TAU/TAU-MAX | V/U |
|--------|---------|--------|----------------------------|----------|--------|--------|-------------|---------|
| 1.200 | 4.694 | 2881. | .8610 | .9632 | .8772 | 25.67 | .7066 | .000616 |
| 1.240 | 4.853 | 2979. | .8653 | .9643 | .8812 | 25.79 | .6893 | .000646 |
| 1.266 | 4.953 | 3039. | .8706 | .9656 | .8860 | 25.93 | .6782 | .000665 |
| 1.299 | 5.082 | 3119. | .8758 | .9669 | .8907 | 26.08 | .6635 | .000691 |
| 1.347 | 5.270 | 3235. | .8817 | .9683 | .8960 | 26.24 | .6414 | .000728 |
| 1.385 | 5.420 | 3326. | .8866 | .9694 | .9004 | 26.37 | .6236 | .000758 |
| 1.423 | 5.569 | 3418. | .8899 | .9704 | .9033 | 26.46 | .6055 | .000788 |
| 1.454 | 5.688 | 3491. | .8943 | .9715 | .9073 | 26.58 | .5907 | .000812 |
| 1.493 | 5.842 | 3585. | .9009 | .9732 | .9132 | 26.76 | .5713 | .000944 |
| 1.522 | 5.956 | 3655. | .9024 | .9736 | .9146 | 26.81 | .5568 | .000868 |
| 1.545 | 6.045 | 3710. | .9047 | .9742 | .9166 | 26.87 | .5452 | .000886 |
| 1.581 | 6.185 | 3796. | .9112 | .9758 | .9224 | 27.04 | .5271 | .000915 |
| 1.619 | 6.334 | 3887. | .9132 | .9764 | .9241 | 27.10 | .5075 | .000947 |
| 1.654 | 6.473 | 3973. | .9174 | .9775 | .9279 | 27.21 | .4890 | .000976 |
| 1.695 | 6.632 | 4070. | .9226 | .9788 | .9325 | 27.35 | .4676 | .001009 |
| 1.746 | 6.830 | 4192. | .9280 | .9802 | .9373 | 27.50 | .4408 | .001051 |
| 1.776 | 6.950 | 4265. | .9331 | .9816 | .9418 | 27.64 | .4245 | .001076 |
| 1.859 | 7.273 | 4463. | .9412 | .9837 | .9489 | 27.86 | .3803 | .001144 |
| 1.901 | 7.436 | 4564. | .9458 | .9850 | .9530 | 27.98 | .3580 | .001178 |
| 1.929 | 7.531 | 4622. | .9570 | .9867 | .9584 | 28.15 | .3450 | .001197 |
| 1.960 | 7.670 | 4707. | .9526 | .9868 | .9590 | 28.17 | .3262 | .001226 |
| 2.007 | 7.854 | 4820. | .9580 | .9883 | .9636 | 28.31 | .3013 | .001263 |
| 2.038 | 7.973 | 4893. | .9603 | .9889 | .9656 | 28.37 | .2853 | .001286 |
| 2.069 | 8.077 | 4957. | .9630 | .9897 | .9680 | 28.45 | .2714 | .001307 |
| 2.099 | 8.211 | 5040. | .9636 | .9898 | .9686 | 28.46 | .2533 | .001333 |
| 2.132 | 8.341 | 5119. | .9693 | .9914 | .9735 | 28.61 | .2368 | .001357 |
| 2.157 | 8.440 | 5180. | .9697 | .9915 | .9739 | 28.63 | .2240 | .001376 |
| 2.188 | 8.559 | 5253. | .9733 | .9925 | .9769 | 28.72 | .2088 | .001398 |
| 2.218 | 8.678 | 5326. | .9754 | .9931 | .9788 | 28.78 | .1938 | .001420 |
| 2.251 | 8.808 | 5406. | .9780 | .9938 | .9810 | 28.85 | .1779 | .001443 |
| 2.287 | 8.947 | 5491. | .9796 | .9942 | .9824 | 28.89 | .1611 | .001467 |
| 2.317 | 9.066 | 5564. | .9803 | .9944 | .9831 | 28.91 | .1470 | .001487 |
| 2.358 | 9.225 | 5662. | .9831 | .9952 | .9854 | 28.98 | .1288 | .001513 |
| 2.397 | 9.379 | 5756. | .9852 | .9958 | .9873 | 29.04 | .1113 | .001538 |
| 2.432 | 9.513 | 5839. | .9864 | .9961 | .9883 | 29.07 | .0972 | .001558 |
| 2.475 | 9.682 | 5942. | .9889 | .9968 | .9905 | 29.14 | .0798 | .001582 |
| 2.513 | 9.831 | 6034. | .9897 | .9970 | .9911 | 29.16 | .0652 | .001603 |
| 2.538 | 9.930 | 6095. | .9914 | .9975 | .9926 | 29.21 | .0558 | .001616 |
| 2.574 | 10.069 | 6180. | .9931 | .9980 | .9941 | 29.25 | .0437 | .001633 |
| 2.623 | 10.263 | 6299. | .9937 | .9982 | .9946 | 29.27 | .0268 | .001656 |
| 2.659 | 10.402 | 6384. | .9952 | .9986 | .9959 | 29.31 | .0159 | .001671 |
| 2.691 | 10.527 | 6461. | .9962 | .9989 | .9967 | 29.33 | .0068 | .001684 |
| 2.733 | 10.690 | 6561. | .9966 | .9990 | .9971 | 29.34 | 0.0000 | .001693 |
| 2.769 | 10.835 | 6650. | .9979 | .9994 | .9982 | 29.38 | 0.0000 | .001693 |
| 2.830 | 11.073 | 6796. | .9987 | .9996 | .9988 | 29.40 | 0.0000 | .001693 |
| 2.909 | 11.381 | 6985. | .9990 | .9997 | .9992 | 29.41 | 0.0000 | .001693 |
| 2.988 | 11.689 | 7174. | 1.0000 | 1.0000 | 1.0000 | 29.43 | 0.0000 | .001693 |
| 3.054 | 11.947 | 7333. | 1.0002 | 1.0000 | 1.0001 | 29.44 | 0.0000 | .001693 |
| 3.133 | 12.255 | 7522. | .9991 | .9997 | .9992 | 29.41 | 0.0000 | .001693 |
| 3.205 | 12.539 | 7696. | .9996 | .9999 | .9997 | 29.42 | 0.0000 | .001693 |
| 3.294 | 12.886 | 7909. | 1.0000 | 1.0000 | 1.0000 | 29.43 | 0.0000 | .001693 |
| 3.380 | 13.224 | 8116. | 1.0004 | 1.0001 | 1.0003 | 29.44 | 0.0000 | .001693 |
| 3.446 | 13.482 | 8275. | .9996 | .9999 | .9997 | 29.42 | 0.0000 | .001693 |
| 3.526 | 13.795 | 8467. | .9998 | .9999 | .9998 | 29.43 | 0.0000 | .001693 |
| 3.583 | 14.019 | 8604. | 1.0000 | 1.0000 | 1.0000 | 29.43 | 0.0000 | .001693 |
| 3.674 | 14.372 | 8821. | .9996 | .9999 | .9997 | 29.42 | 0.0000 | .001693 |

TABLE A 9. (CONT.)
 PROFILE - JPL-5 - - - PITOT PRESSURE DATA

EDGE MACH NO.= .9651
 X= 7.62 CM

TOTAL PRESSURE= .6665E+05 N/M**2
 TOTAL TEMPERATURE= 312.05 DEG-K

UE= 314.15 M/SEC
 RE-DELTA-STAR= 39440.

DELTA STAR= .4407 CM
 RE-THETA= 23850.

THETA= .2665 CM
 NUWALL= .4549 CM**2/SEC

M= 1.653

LEAST SQUARE FIT PARAMETERS

UTAU= 10.9025 M/SEC
 CHISQR= .7261E-05

CF= .002067
 YMAX= 2.663 CM

PI= .6222
 YMIN= .074 CM

DELTA= 2.8165 CM

| Y (CM) | Y/THETA | Y-PLUS | M/ME | RHO/RHOF | U/UF | U-PLUS | TAU/TAU-MAX | V/U |
|--------|---------|--------|--------|----------|--------|--------|-------------|----------|
| 0.000 | 0.000 | 0. | 0.0000 | .8584 | 0.0000 | 0.00 | 1.0000 | 0.000000 |
| .010 | .038 | 24. | .3929 | .8803 | .4188 | 12.11 | 1.0000 | 0.000000 |
| .011 | .042 | 77. | .4090 | .8821 | .4354 | 12.60 | .9999 | 0.000000 |
| .026 | .100 | 63. | .5002 | .8939 | .5290 | 15.34 | .9989 | .000005 |
| .033 | .123 | 79. | .5259 | .8976 | .5551 | 16.11 | .9984 | .000008 |
| .053 | .200 | 127. | .5526 | .9016 | .5820 | 16.90 | .9967 | .000015 |
| .069 | .185 | 118. | .5522 | .9016 | .5815 | 16.89 | .9967 | .000015 |
| .074 | .281 | 179. | .5820 | .9064 | .6113 | 17.77 | .9947 | .000027 |
| .105 | .395 | 257. | .6179 | .9116 | .6419 | 18.48 | .9915 | .000032 |
| .123 | .462 | 295. | .6754 | .9138 | .6542 | 19.04 | .9896 | .000039 |
| .140 | .528 | 337. | .6352 | .9155 | .6638 | 19.33 | .9875 | .000045 |
| .156 | .586 | 374. | .6458 | .9174 | .6742 | 19.64 | .9857 | .000050 |
| .186 | .700 | 447. | .6627 | .9206 | .6907 | 20.13 | .9818 | .000061 |
| .207 | .776 | 496. | .6663 | .9213 | .6942 | 20.23 | .9791 | .000068 |
| .238 | .895 | 577. | .6770 | .9233 | .7045 | 20.54 | .9749 | .000080 |
| .255 | .957 | 611. | .6894 | .9257 | .7145 | 20.90 | .9724 | .000086 |
| .265 | .995 | 636. | .6880 | .9254 | .7152 | 20.86 | .9709 | .000089 |
| .292 | 1.096 | 700. | .6920 | .9262 | .7191 | 20.98 | .9670 | .000099 |
| .331 | 1.243 | 794. | .7044 | .9286 | .7309 | 21.33 | .9608 | .000115 |
| .367 | 1.377 | 879. | .7174 | .9313 | .7434 | 21.71 | .9550 | .000128 |
| .392 | 1.472 | 940. | .7204 | .9319 | .7463 | 21.79 | .9507 | .000138 |
| .425 | 1.596 | 1019. | .7292 | .9337 | .7547 | 22.05 | .9449 | .000152 |
| .466 | 1.748 | 1117. | .7317 | .9342 | .7570 | 22.12 | .9374 | .000169 |
| .496 | 1.843 | 1184. | .7411 | .9362 | .7659 | 22.38 | .9320 | .000181 |
| .519 | 1.940 | 1244. | .7509 | .9382 | .7752 | 22.66 | .9270 | .000192 |
| .547 | 2.053 | 1311. | .7536 | .9388 | .7778 | 22.74 | .9212 | .000204 |
| .580 | 2.177 | 1391. | .7622 | .9407 | .7859 | 22.99 | .9142 | .000219 |
| .621 | 2.330 | 1488. | .7670 | .9417 | .7904 | 23.12 | .9052 | .000238 |
| .638 | 2.396 | 1531. | .7693 | .9422 | .7926 | 23.19 | .9012 | .000247 |
| .669 | 2.511 | 1604. | .7773 | .9439 | .8000 | 23.41 | .8940 | .000261 |
| .707 | 2.654 | 1695. | .7824 | .9451 | .8048 | 23.56 | .8848 | .000280 |
| .750 | 2.816 | 1798. | .7864 | .9460 | .8086 | 23.67 | .8738 | .000302 |
| .792 | 2.973 | 1899. | .7927 | .9474 | .8144 | 23.85 | .8626 | .000324 |
| .842 | 3.235 | 2066. | .8030 | .9497 | .8240 | 24.14 | .8429 | .000363 |
| .891 | 3.345 | 2136. | .8090 | .9510 | .8295 | 24.30 | .8343 | .000379 |
| .918 | 3.445 | 2200. | .8130 | .9520 | .8333 | 24.42 | .8262 | .000395 |
| .947 | 3.573 | 2282. | .8157 | .9526 | .8357 | 24.49 | .8155 | .000415 |
| .995 | 3.735 | 2386. | .8231 | .9543 | .8476 | 24.70 | .8015 | .000441 |
| 1.035 | 3.883 | 2480. | .8315 | .9563 | .8503 | 24.93 | .7883 | .000465 |
| 1.066 | 4.002 | 2556. | .8391 | .9581 | .8573 | 25.15 | .7773 | .000485 |
| 1.103 | 4.141 | 2645. | .8407 | .9585 | .8587 | 25.19 | .7642 | .000509 |

| Y (CM) | Y/THETA | Y-PLUS | TABLE A 9. (CONT.) M/ME | RHO/RHOF | U/UE | U-PLUS | TAU/TAU-MAX | V/U |
|--------|---------|--------|----------------------------|----------|--------|--------|-------------|---------|
| 1.139 | 4.274 | 7730. | .8452 | .9595 | .8678 | 25.32 | .7512 | .000532 |
| 1.167 | 4.379 | 2797. | .8512 | .9610 | .8683 | 25.48 | .7407 | .000551 |
| 1.210 | 4.541 | 2900. | .8565 | .9623 | .8732 | 25.63 | .7241 | .000580 |
| 1.253 | 4.703 | 3004. | .8648 | .9643 | .8807 | 25.86 | .7070 | .000610 |
| 1.278 | 4.798 | 3065. | .8660 | .9646 | .8817 | 25.89 | .6966 | .000628 |
| 1.316 | 4.941 | 3156. | .8730 | .9663 | .8881 | 26.09 | .6809 | .000655 |
| 1.352 | 5.075 | 3241. | .8763 | .9671 | .8911 | 26.18 | .6658 | .000680 |
| 1.389 | 5.213 | 3329. | .8811 | .9683 | .8954 | 26.31 | .6498 | .000707 |
| 1.424 | 5.456 | 3485. | .8887 | .9702 | .9022 | 26.52 | .6210 | .000755 |
| 1.497 | 5.618 | 3588. | .8882 | .9701 | .9018 | 26.51 | .6012 | .000788 |
| 1.525 | 5.723 | 3655. | .8954 | .9719 | .9083 | 26.71 | .5883 | .000809 |
| 1.548 | 5.808 | 3710. | .8973 | .9724 | .9099 | 26.76 | .5775 | .000827 |
| 1.584 | 5.947 | 3798. | .9042 | .9741 | .9161 | 26.95 | .5600 | .000855 |
| 1.620 | 6.080 | 3883. | .9049 | .9743 | .9167 | 26.96 | .5429 | .000882 |
| 1.642 | 6.161 | 3935. | .9090 | .9754 | .9203 | 27.08 | .5324 | .000899 |
| 1.673 | 6.280 | 4011. | .9139 | .9766 | .9247 | 27.21 | .5168 | .000924 |
| 1.713 | 6.428 | 4106. | .9183 | .9778 | .9287 | 27.33 | .4973 | .000954 |
| 1.751 | 6.571 | 4197. | .9221 | .9788 | .9320 | 27.43 | .4783 | .000984 |
| 1.775 | 6.661 | 4255. | .9260 | .9798 | .9355 | 27.54 | .4662 | .001003 |
| 1.808 | 6.785 | 4334. | .9270 | .9800 | .9363 | 27.57 | .4495 | .001029 |
| 1.850 | 6.943 | 4434. | .9334 | .9817 | .9420 | 27.74 | .4282 | .001061 |
| 1.885 | 7.076 | 4520. | .9366 | .9826 | .9449 | 27.83 | .4101 | .001089 |
| 1.906 | 7.152 | 4568. | .9396 | .9834 | .9475 | 27.91 | .3997 | .001105 |
| 1.940 | 7.281 | 4650. | .9415 | .9839 | .9492 | 27.96 | .3821 | .001131 |
| 1.990 | 7.467 | 4769. | .9480 | .9856 | .9549 | 28.14 | .3568 | .001169 |
| 2.009 | 7.877 | 5031. | .9575 | .9882 | .9632 | 28.40 | .3012 | .001252 |
| 2.133 | 8.005 | 5113. | .9606 | .9890 | .9659 | 28.48 | .2843 | .001277 |
| 2.167 | 8.134 | 5195. | .9648 | .9902 | .9696 | 28.59 | .2673 | .001302 |
| 2.203 | 8.267 | 5281. | .9635 | .9898 | .9685 | 28.56 | .2498 | .001327 |
| 2.256 | 8.467 | 5408. | .9694 | .9914 | .9736 | 28.72 | .2240 | .001364 |
| 2.292 | 8.601 | 5494. | .9718 | .9921 | .9756 | 28.78 | .2071 | .001389 |
| 2.338 | 8.772 | 5603. | .9766 | .9934 | .9798 | 28.91 | .1858 | .001419 |
| 2.341 | 8.934 | 5707. | .9793 | .9942 | .9821 | 28.98 | .1662 | .001447 |
| 2.410 | 9.044 | 5777. | .9802 | .9944 | .9830 | 29.01 | .1532 | .001465 |
| 2.442 | 9.163 | 5853. | .9819 | .9949 | .9844 | 29.05 | .1394 | .001485 |
| 2.480 | 9.306 | 5944. | .9862 | .9961 | .9881 | 29.17 | .1233 | .001508 |
| 2.534 | 9.511 | 6075. | .9869 | .9963 | .9887 | 29.19 | .1011 | .001539 |
| 2.581 | 9.687 | 6188. | .9888 | .9968 | .9904 | 29.24 | .0829 | .001564 |
| 2.627 | 9.840 | 6285. | .9923 | .9978 | .9934 | 29.33 | .0680 | .001585 |
| 2.663 | 9.992 | 6382. | .9936 | .9982 | .9945 | 29.37 | .0537 | .001605 |
| 2.698 | 10.126 | 6468. | .9943 | .9984 | .9951 | 29.39 | .0419 | .001621 |
| 2.741 | 10.288 | 6571. | .9934 | .9981 | .9943 | 29.36 | .0283 | .001640 |
| 2.774 | 10.412 | 6650. | .9950 | .9986 | .9957 | 29.40 | .0186 | .001653 |
| 2.815 | 10.564 | 6748. | .9951 | .9986 | .9958 | 29.41 | .0075 | .001669 |
| 2.862 | 10.740 | 6860. | .9973 | .9992 | .9977 | 29.47 | 0.0000 | .001679 |
| 2.894 | 10.860 | 6936. | .9976 | .9993 | .9980 | 29.47 | 0.0000 | .001679 |
| 2.970 | 11.146 | 7119. | .9987 | .9996 | .9989 | 29.50 | 0.0000 | .001679 |
| 3.045 | 11.427 | 7299. | .9993 | .9998 | .9994 | 29.52 | 0.0000 | .001679 |
| 3.117 | 11.698 | 7472. | .9988 | .9996 | .9989 | 29.50 | 0.0000 | .001679 |
| 3.191 | 11.937 | 7624. | 1.0001 | 1.0000 | 1.0001 | 29.54 | 0.0000 | .001679 |
| 3.272 | 12.280 | 7843. | 1.0007 | 1.0002 | 1.0006 | 29.56 | 0.0000 | .001679 |
| 3.347 | 12.561 | 8023. | 1.0002 | 1.0000 | 1.0002 | 29.54 | 0.0000 | .001679 |
| 3.439 | 12.904 | 8242. | 1.0000 | 1.0000 | 1.0000 | 29.54 | 0.0000 | .001679 |
| 3.536 | 13.271 | 8477. | .9991 | .9997 | .9992 | 29.51 | 0.0000 | .001679 |
| 3.613 | 13.557 | 8659. | .9997 | .9999 | .9997 | 29.53 | 0.0000 | .001679 |
| 3.684 | 13.824 | 8830. | 1.0008 | 1.0002 | 1.0007 | 29.55 | 0.0000 | .001679 |

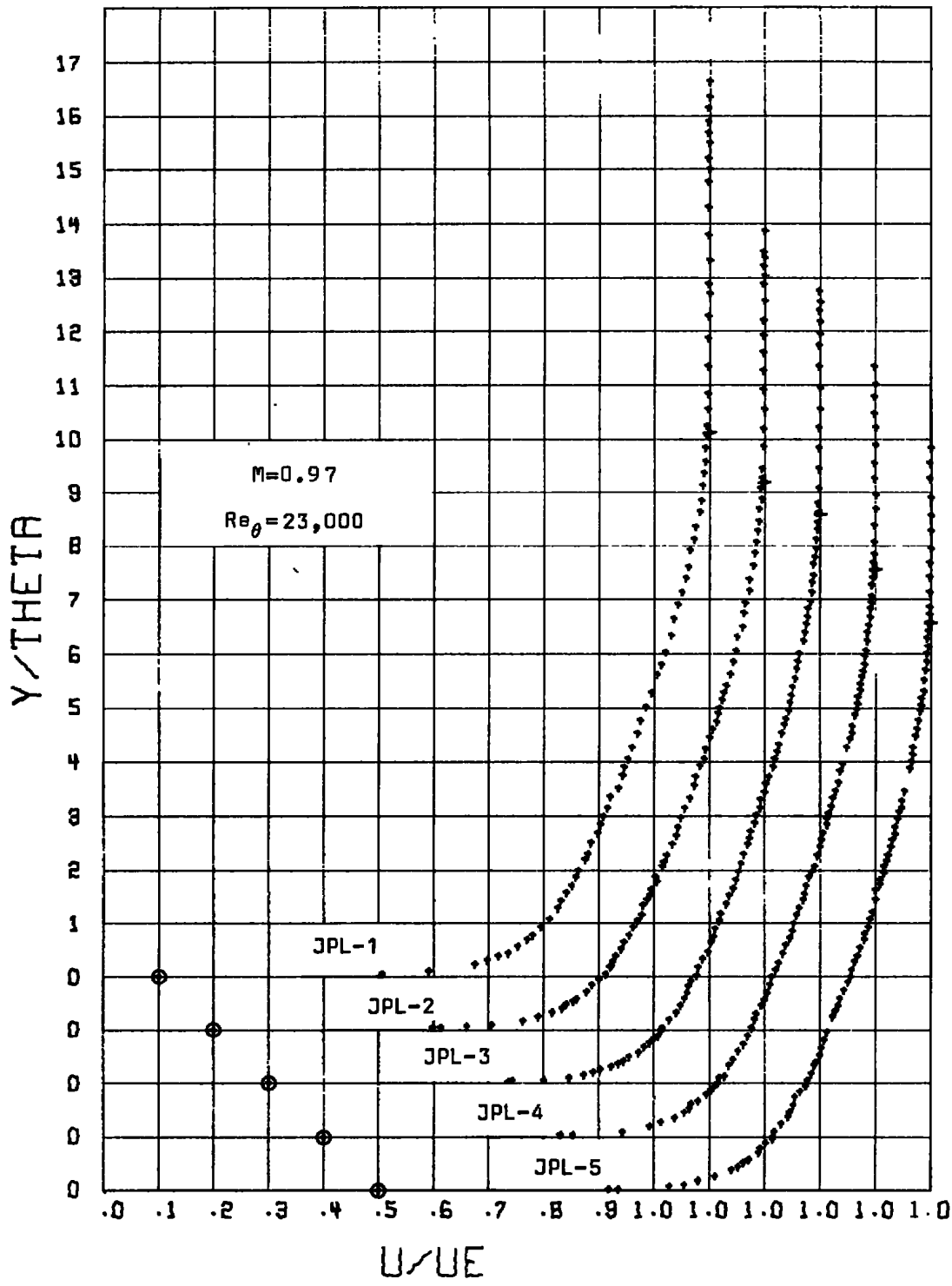


Figure A21. Mean Velocity Profiles.

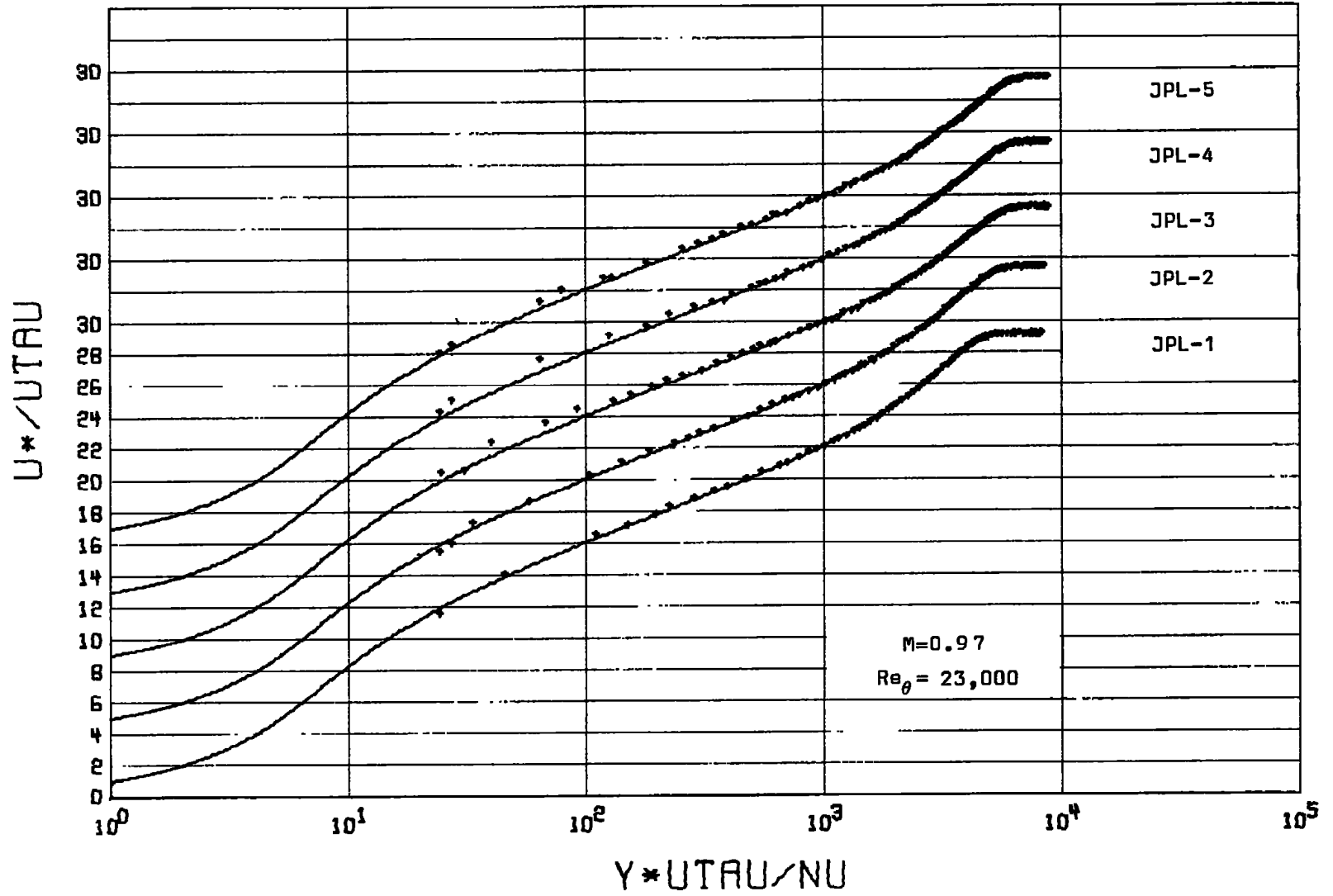


Figure A22. Van Driest Scaled Mean Velocity Profiles.

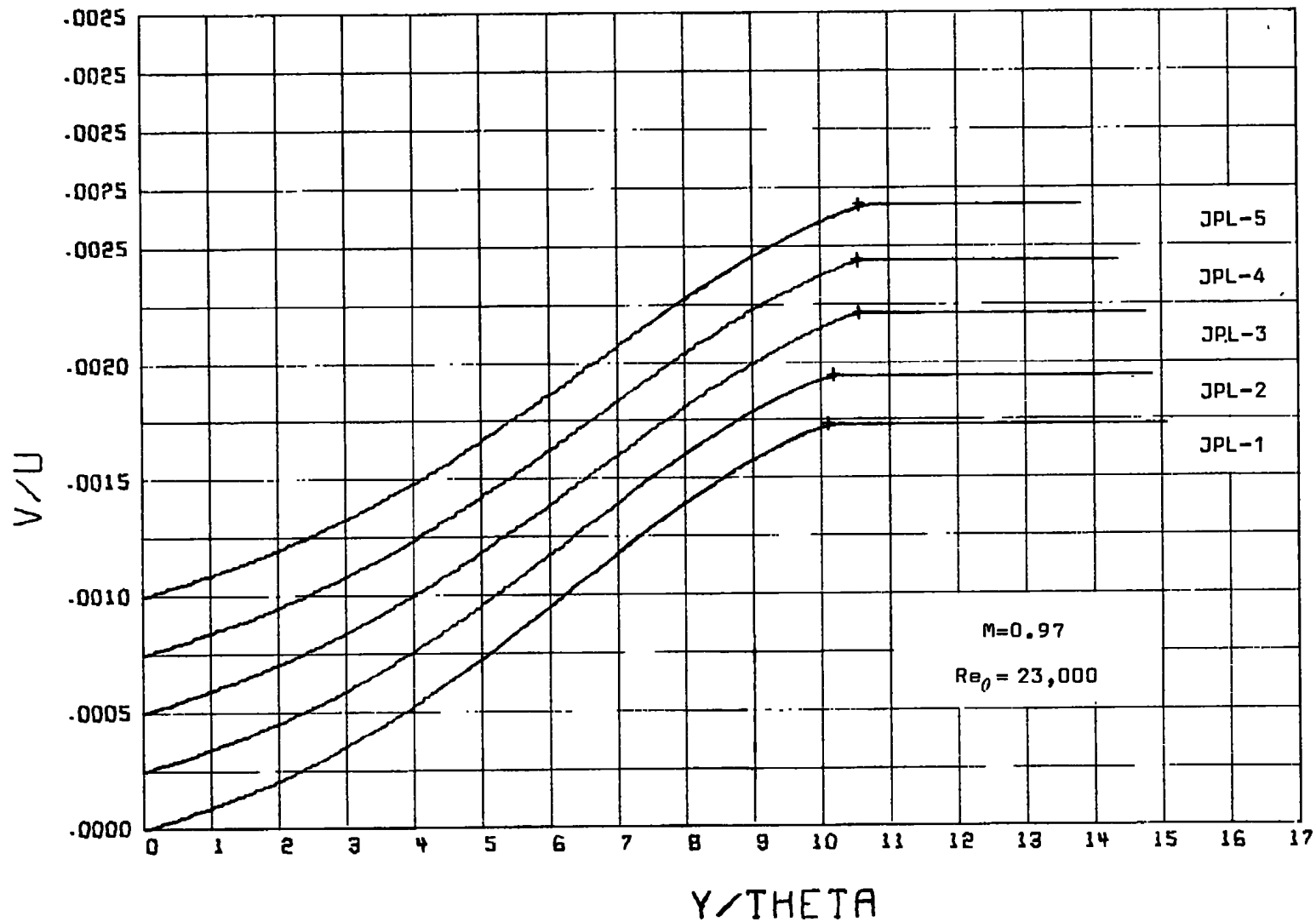


Figure A23. Normal Velocity Distribution.

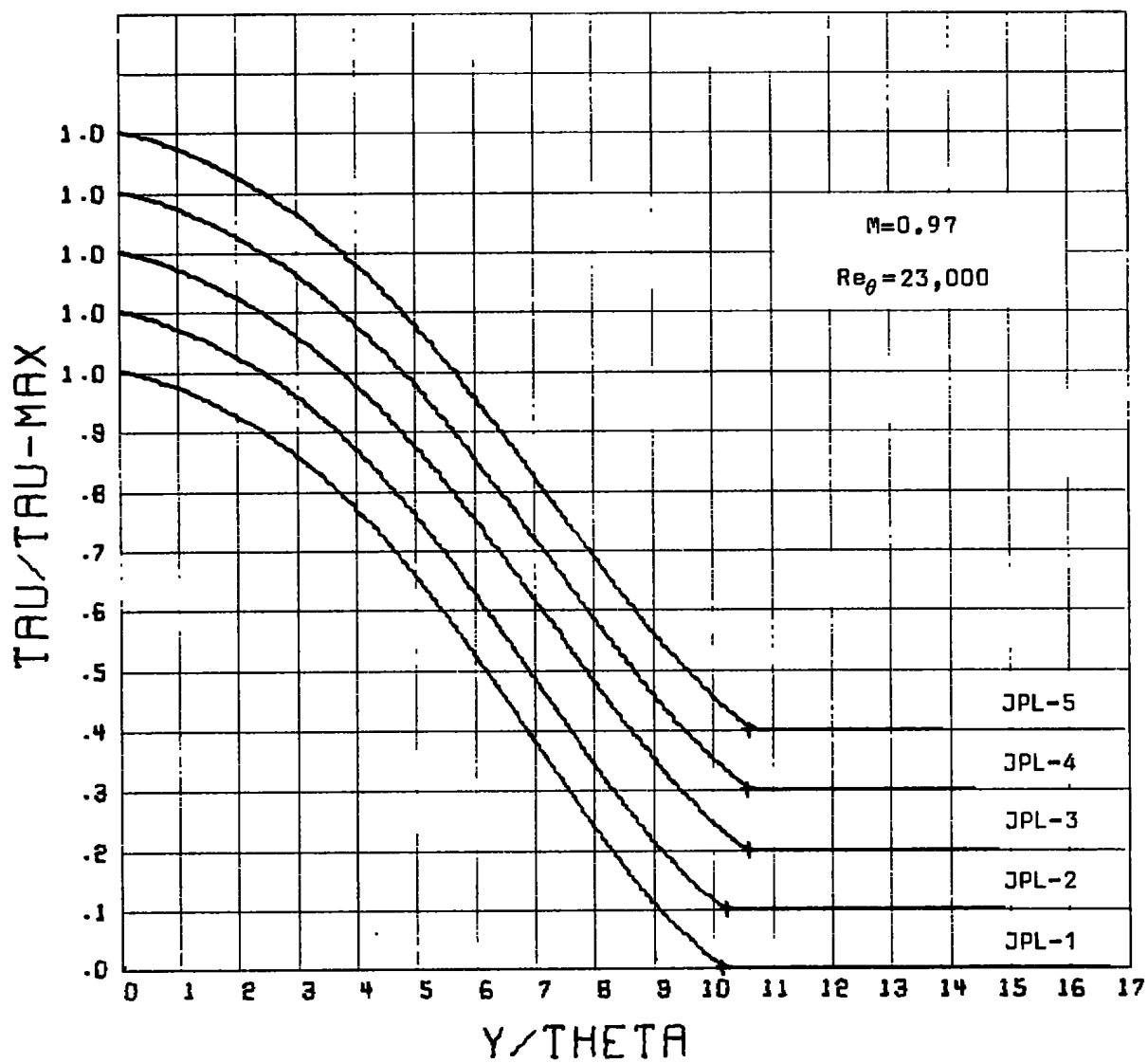


Figure A24. Shear Stress Distribution.

TABLE A10. DATA SUMMARY
PROFILE - JPL-1 -- - PITOT PRESSURE DATA

EDGE MACH NO.= .9648 TOTAL PRESSURE= .1336E+06 N/M**2
X=-48.43 CM TOTAL TEMPERATURE= 327.58 DEG-K

UE= 321.78 M/SEC DELTA STAR= .3113 CM THETA= .1898 CM H= 1.639
RE-DELTA-STAR= 53010. RE-THETA= 32330. NUWALL= .2491 CM**2/SEC

LEAST SQUARE FIT PARAMETERS
UTAU= 10.9011 M/SEC CF= .001970 PI= .6331 DELTA= 2.0158 CM
CHISQR= .1104E-04 YMAX= 1.892 CM YMIN= .030 CM

| Y (CM) | Y/THETA | Y-PLUS | M/ME | RHO/RHDE | U/UE | U-PLUS | TAU/TAU-MAX | V/U |
|--------|---------|--------|--------|----------|--------|--------|-------------|----------|
| 0.000 | 0.000 | 0. | 0.0000 | .8585 | 0.0000 | 0.00 | 1.0000 | 0.000000 |
| .011 | .060 | 50. | .4543 | .8877 | .4822 | 14.31 | 1.0000 | 0.000000 |
| .021 | .113 | 94. | .5297 | .8982 | .5589 | 16.62 | .9989 | .000004 |
| .030 | .160 | 133. | .5556 | .9027 | .5849 | 17.40 | .9978 | .000009 |
| .052 | .274 | 227. | .5922 | .9081 | .6214 | 18.51 | .9950 | .000018 |
| .069 | .367 | 305. | .6139 | .9118 | .6429 | 19.17 | .9924 | .000026 |
| .087 | .461 | 383. | .6337 | .9153 | .6623 | 19.76 | .9896 | .000035 |
| .121 | .647 | 533. | .6576 | .9197 | .6857 | 20.47 | .9838 | .000051 |
| .143 | .755 | 678. | .6704 | .9221 | .6981 | 20.85 | .9798 | .000061 |
| .172 | .909 | 755. | .6861 | .9251 | .7133 | 21.31 | .9742 | .000075 |
| .203 | 1.070 | 889. | .6956 | .9270 | .7275 | 21.60 | .9679 | .000090 |
| .231 | 1.217 | 1011. | .7069 | .9297 | .7334 | 21.93 | .9619 | .000104 |
| .264 | 1.391 | 1156. | .7172 | .9313 | .7432 | 22.23 | .9543 | .000121 |
| .279 | 1.471 | 1222. | .7226 | .9324 | .7484 | 22.39 | .9507 | .000129 |
| .312 | 1.645 | 1367. | .7344 | .9348 | .7596 | 22.73 | .9424 | .000147 |
| .337 | 1.779 | 1478. | .7404 | .9360 | .7652 | 22.91 | .9358 | .000161 |
| .351 | 1.852 | 1539. | .7430 | .9366 | .7677 | 22.99 | .9320 | .000169 |
| .372 | 1.959 | 1628. | .7504 | .9381 | .7747 | 23.20 | .9263 | .000181 |
| .403 | 2.126 | 1767. | .7574 | .9397 | .7813 | 23.41 | .9171 | .000199 |
| .430 | 2.267 | 1884. | .7663 | .9416 | .7897 | 23.66 | .9090 | .000216 |
| .458 | 2.414 | 2006. | .7733 | .9431 | .7963 | 23.87 | .9001 | .000233 |
| .494 | 2.601 | 2161. | .7786 | .9443 | .8012 | 24.02 | .8883 | .000256 |
| .528 | 2.782 | 2312. | .7920 | .9472 | .8137 | 24.41 | .8763 | .000279 |
| .568 | 2.996 | 2489. | .8003 | .9491 | .8215 | 24.65 | .8611 | .000308 |
| .607 | 3.196 | 2656. | .8054 | .9503 | .8262 | 24.79 | .8462 | .000335 |
| .647 | 3.410 | 2834. | .8131 | .9520 | .8333 | 25.02 | .8294 | .000366 |
| .678 | 3.571 | 2967. | .8217 | .9540 | .8413 | 25.26 | .8161 | .000390 |
| .703 | 3.705 | 3079. | .8230 | .9543 | .8424 | 25.30 | .8047 | .000410 |
| .728 | 3.838 | 3190. | .8308 | .9562 | .8497 | 25.53 | .7929 | .000431 |
| .760 | 4.006 | 3329. | .8368 | .9576 | .8551 | 25.70 | .7776 | .000457 |
| .799 | 4.159 | 3456. | .8416 | .9587 | .8596 | 25.83 | .7631 | .000482 |
| .819 | 4.313 | 3584. | .8466 | .9599 | .8641 | 25.98 | .7481 | .000508 |
| .844 | 4.447 | 3695. | .8533 | .9615 | .8702 | 26.17 | .7346 | .000530 |
| .881 | 4.641 | 3857. | .8607 | .9633 | .8769 | 26.38 | .7145 | .000564 |
| .916 | 4.828 | 4017. | .8648 | .9643 | .8807 | 26.49 | .6944 | .000597 |
| .944 | 4.975 | 4134. | .8713 | .9659 | .8865 | 26.68 | .6781 | .000623 |
| .970 | 5.109 | 4246. | .8773 | .9674 | .8920 | 26.85 | .6629 | .000648 |
| .996 | 5.250 | 4362. | .8826 | .9687 | .8968 | 27.00 | .6467 | .000674 |
| 1.028 | 5.417 | 4501. | .8852 | .9693 | .8990 | 27.07 | .6270 | .000705 |
| 1.043 | 5.497 | 4568. | .8887 | .9702 | .9022 | 27.17 | .6173 | .000720 |
| 1.075 | 5.664 | 4707. | .8937 | .9715 | .9067 | 27.31 | .5969 | .000752 |

| Y (CM) | Y/TMFTA | Y-PLUS | TABLE A10. M/ME | (CONT.) RHO/RHOE | U/UE | U-PLUS | TAU/TAU-MAX | V/U |
|--------|---------|--------|--------------------|---------------------|--------|--------|-------------|---------|
| 1.115 | 5.872 | 4879. | .9003 | .9732 | .9126 | 27.49 | .5711 | .000792 |
| 1.137 | 5.992 | 4979. | .9042 | .9741 | .9161 | 27.60 | .5558 | .000816 |
| 1.167 | 6.146 | 5107. | .9092 | .9754 | .9206 | 27.75 | .5361 | .000846 |
| 1.195 | 6.293 | 5229. | .9145 | .9768 | .9253 | 27.89 | .5169 | .000875 |
| 1.216 | 6.407 | 5324. | .9176 | .9776 | .9280 | 27.98 | .5020 | .000897 |
| 1.239 | 6.527 | 5424. | .9209 | .9785 | .9309 | 28.07 | .4860 | .000921 |
| 1.264 | 6.661 | 5535. | .9255 | .9797 | .9350 | 28.20 | .4682 | .000947 |
| 1.303 | 6.861 | 5702. | .9281 | .9803 | .9373 | 28.27 | .4412 | .000987 |
| 1.330 | 7.009 | 5824. | .9334 | .9817 | .9420 | 28.42 | .4213 | .001016 |
| 1.352 | 7.172 | 5919. | .9392 | .9833 | .9471 | 28.58 | .4058 | .001038 |
| 1.384 | 7.290 | 6057. | .9410 | .9838 | .9487 | 28.63 | .3831 | .001071 |
| 1.417 | 7.463 | 6202. | .9477 | .9856 | .9546 | 28.82 | .3595 | .001105 |
| 1.437 | 7.570 | 6291. | .9495 | .9860 | .9561 | 28.87 | .3450 | .001126 |
| 1.465 | 7.718 | 6413. | .9533 | .9871 | .9595 | 28.97 | .3251 | .001154 |
| 1.497 | 7.885 | 6552. | .9555 | .9877 | .9614 | 29.03 | .3026 | .001185 |
| 1.534 | 8.079 | 6713. | .9613 | .9892 | .9665 | 29.20 | .2768 | .001221 |
| 1.563 | 8.233 | 6841. | .9648 | .9907 | .9695 | 29.29 | .2566 | .001250 |
| 1.582 | 8.333 | 6924. | .9663 | .9906 | .9709 | 29.33 | .2435 | .001268 |
| 1.625 | 8.560 | 7113. | .9713 | .9929 | .9752 | 29.47 | .2145 | .001308 |
| 1.662 | 8.754 | 7275. | .9743 | .9928 | .9778 | 29.55 | .1903 | .001341 |
| 1.694 | 8.868 | 7369. | .9776 | .9937 | .9807 | 29.65 | .1764 | .001360 |
| 1.727 | 9.095 | 7558. | .9789 | .9940 | .9818 | 29.68 | .1494 | .001396 |
| 1.752 | 9.229 | 7669. | .9819 | .9949 | .9844 | 29.76 | .1340 | .001417 |
| 1.790 | 9.430 | 7836. | .9849 | .9957 | .9870 | 29.84 | .1118 | .001447 |
| 1.818 | 9.577 | 7958. | .9877 | .9965 | .9894 | 29.92 | .0962 | .001468 |
| 1.854 | 9.744 | 8114. | .9899 | .9971 | .9913 | 29.98 | .0772 | .001493 |
| 1.892 | 9.965 | 8281. | .9915 | .9976 | .9927 | 30.03 | .0580 | .001518 |
| 1.922 | 10.175 | 8414. | .9921 | .9978 | .9932 | 30.04 | .0436 | .001537 |
| 1.955 | 10.299 | 8558. | .9935 | .9981 | .9944 | 30.08 | .0289 | .001557 |
| 1.981 | 10.433 | 8670. | .9948 | .9985 | .9955 | 30.12 | .0184 | .001571 |
| 2.011 | 10.593 | 8803. | .9956 | .9987 | .9962 | 30.14 | .0067 | .001586 |
| 2.047 | 10.781 | 8959. | .9969 | .9991 | .9973 | 30.17 | 0.0000 | .001595 |
| 2.067 | 10.888 | 9048. | .9969 | .9991 | .9973 | 30.17 | 0.0000 | .001595 |
| 2.092 | 11.071 | 9159. | .9969 | .9991 | .9973 | 30.17 | 0.0000 | .001595 |
| 2.172 | 11.443 | 9509. | .9984 | .9995 | .9986 | 30.22 | 0.0000 | .001595 |
| 2.237 | 11.784 | 9792. | .9984 | .9995 | .9986 | 30.22 | 0.0000 | .001595 |
| 2.321 | 12.225 | 10159. | .9992 | .9997 | .9993 | 30.24 | 0.0000 | .001595 |
| 2.401 | 12.647 | 10509. | 1.0000 | 1.0000 | 1.0000 | 30.26 | 0.0000 | .001595 |
| 2.504 | 13.188 | 10959. | .9988 | .9996 | .9990 | 30.23 | 0.0000 | .001595 |
| 2.599 | 13.690 | 11376. | 1.0001 | 1.0000 | 1.0001 | 30.26 | 0.0000 | .001595 |
| 2.692 | 14.178 | 11782. | .9997 | .9999 | .9998 | 30.25 | 0.0000 | .001595 |
| 2.771 | 14.593 | 12127. | 1.0000 | 1.0000 | 1.0000 | 30.26 | 0.0000 | .001595 |
| 2.860 | 15.061 | 12516. | .9997 | .9999 | .9998 | 30.25 | 0.0000 | .001595 |
| 2.947 | 15.523 | 12899. | 1.0002 | 1.0000 | 1.0002 | 30.27 | 0.0000 | .001595 |
| 3.039 | 16.004 | 13299. | .9997 | .9999 | .9998 | 30.25 | 0.0000 | .001595 |
| 3.139 | 16.532 | 13738. | .9995 | .9998 | .9995 | 30.24 | 0.0000 | .001595 |

TABLE A10. (CONT.)
 PROFILE - JPL-2 - - - PITOT PRESSURE DATA

EDGE MACH NO.= .9626 TOTAL PRESSURE= .1327E+06 N/M**2
 X=-26.21 CM TOTAL TEMPERATURE= 329.76 DEG-K

UE= 327.24 M/SEC DELTA STAR= .3559 CM THETA= .2175 CM H= 1.636
 RE-DELTA-STAR= 59320. RE-THETA= 36250. NUWALL= .2531 CM**2/SEC

LEAST SQUARE FIT PARAMETERS
 UTAU= 10.8298 M/SFC CF= .001940 PI= .6210 DELTA= 2.3454 CM
 CHISQR= .1512E-04 YMAX= 2.221 CM YMIN= .044 CM

| Y (CM) | Y/THETA | Y-PLUS | M/ME | RHO/RH0E | U/UE | U-PLUS | TAU/TAU-MAX | V/U |
|--------|---------|--------|--------|----------|--------|--------|-------------|----------|
| 0.000 | 0.000 | 0. | 0.0000 | .8590 | 0.0000 | 0.00 | 1.0000 | 0.000000 |
| .010 | .046 | 43. | .4443 | .8869 | .4717 | 14.11 | 1.0000 | 0.000000 |
| .016 | .075 | 70. | .4724 | .8905 | .5006 | 14.98 | .9994 | .000002 |
| .025 | .116 | 108. | .5376 | .8998 | .5667 | 16.99 | .9986 | .000006 |
| .044 | .204 | 189. | .5719 | .9051 | .6011 | 18.04 | .9966 | .000013 |
| .054 | .250 | 233. | .5957 | .9090 | .6248 | 18.76 | .9954 | .000017 |
| .074 | .344 | 320. | .6118 | .9118 | .6407 | 19.25 | .9929 | .000025 |
| .097 | .402 | 374. | .6257 | .9142 | .6544 | 19.67 | .9912 | .000030 |
| .100 | .461 | 429. | .6383 | .9165 | .6667 | 20.05 | .9894 | .000035 |
| .119 | .548 | 510. | .6492 | .9184 | .6774 | 20.38 | .9867 | .000042 |
| .139 | .642 | 597. | .6671 | .9218 | .6949 | 20.91 | .9836 | .000050 |
| .157 | .723 | 673. | .6740 | .9231 | .7015 | 21.17 | .9808 | .000057 |
| .175 | .805 | 749. | .6813 | .9245 | .7086 | 21.34 | .9779 | .000064 |
| .203 | .934 | 869. | .6896 | .9261 | .7166 | 21.58 | .9731 | .000076 |
| .217 | .997 | 928. | .6969 | .9275 | .7236 | 21.80 | .9707 | .000082 |
| .241 | 1.109 | 1032. | .7054 | .9292 | .7318 | 22.05 | .9663 | .000092 |
| .274 | 1.260 | 1173. | .7147 | .9310 | .7407 | 22.33 | .9600 | .000106 |
| .307 | 1.389 | 1293. | .7212 | .9323 | .7469 | 22.52 | .9544 | .000118 |
| .327 | 1.505 | 1401. | .7289 | .9339 | .7542 | 22.75 | .9491 | .000129 |
| .353 | 1.622 | 1510. | .7363 | .9355 | .7613 | 22.97 | .9437 | .000141 |
| .378 | 1.739 | 1619. | .7422 | .9367 | .7668 | 23.14 | .9380 | .000153 |
| .416 | 1.914 | 1782. | .7501 | .9383 | .7743 | 23.37 | .9291 | .000171 |
| .453 | 2.083 | 1939. | .7570 | .9398 | .7809 | 23.58 | .9200 | .000189 |
| .477 | 2.194 | 2043. | .7637 | .9412 | .7872 | 23.77 | .9138 | .000201 |
| .508 | 2.335 | 2173. | .7690 | .9424 | .7921 | 23.93 | .9057 | .000217 |
| .533 | 2.451 | 2282. | .7734 | .9433 | .7963 | 24.06 | .8987 | .000231 |
| .572 | 2.632 | 2450. | .7857 | .9459 | .8073 | 24.40 | .8874 | .000252 |
| .604 | 2.778 | 2586. | .7873 | .9464 | .8093 | 24.46 | .8778 | .000270 |
| .628 | 2.889 | 2689. | .7939 | .9479 | .8154 | 24.65 | .8703 | .000284 |
| .668 | 3.070 | 2858. | .8022 | .9497 | .8231 | 24.90 | .8575 | .000308 |
| .685 | 3.152 | 2934. | .8071 | .9508 | .8277 | 25.04 | .8515 | .000318 |
| .731 | 3.362 | 3130. | .8116 | .9519 | .8319 | 25.17 | .8356 | .000347 |
| .759 | 3.490 | 3249. | .8145 | .9525 | .8346 | 25.25 | .8254 | .000365 |
| .789 | 3.630 | 3379. | .8208 | .9540 | .8404 | 25.44 | .8140 | .000385 |
| .812 | 3.736 | 3477. | .8254 | .9551 | .8446 | 25.57 | .8051 | .000400 |
| .843 | 3.875 | 3607. | .8313 | .9564 | .8500 | 25.74 | .7930 | .000421 |
| .875 | 4.027 | 3744. | .8363 | .9576 | .8546 | 25.88 | .7798 | .000443 |
| .904 | 4.154 | 3868. | .8414 | .9588 | .8593 | 26.03 | .7676 | .000464 |
| .934 | 4.296 | 3999. | .8475 | .9603 | .8649 | 26.21 | .7543 | .000486 |
| .969 | 4.454 | 4146. | .8524 | .9614 | .8693 | 26.35 | .7389 | .000517 |
| .995 | 4.576 | 4260. | .8572 | .9626 | .8737 | 26.48 | .7266 | .000532 |

| Y (CM) | Y/THETA | Y-PLUS | TABLE A10. (CONT.) | | U/U _E | U-PLUS | TAU/TAU-MAX | V/U |
|--------|---------|--------|--------------------|----------------------|------------------|--------|-------------|---------|
| | | | N/ME | RHO/RHO _E | | | | |
| 1.036 | 4.763 | 4434. | .8623 | .9638 | .8783 | 26.63 | .7073 | .000563 |
| 1.069 | 4.915 | 4575. | .8707 | .9659 | .8859 | 26.87 | .6912 | .000589 |
| 1.102 | 5.066 | 4716. | .8745 | .9668 | .8894 | 26.98 | .6747 | .000615 |
| 1.143 | 5.253 | 4890. | .8792 | .9680 | .8936 | 27.11 | .6537 | .000648 |
| 1.176 | 5.405 | 5031. | .8861 | .9697 | .8999 | 27.31 | .6363 | .000675 |
| 1.219 | 5.604 | 5216. | .8895 | .9705 | .9028 | 27.40 | .6130 | .000712 |
| 1.249 | 5.743 | 5346. | .8945 | .9718 | .9074 | 27.55 | .5959 | .000738 |
| 1.285 | 5.907 | 5499. | .9040 | .9742 | .9158 | 27.81 | .5762 | .000768 |
| 1.323 | 6.082 | 5662. | .9046 | .9744 | .9164 | 27.83 | .5545 | .000800 |
| 1.351 | 6.210 | 5781. | .9100 | .9757 | .9212 | 27.98 | .5383 | .000825 |
| 1.389 | 6.386 | 5944. | .9157 | .9772 | .9263 | 28.15 | .5160 | .000858 |
| 1.428 | 6.567 | 6113. | .9228 | .9790 | .9326 | 28.35 | .4975 | .000892 |
| 1.468 | 6.748 | 6281. | .9250 | .9796 | .9346 | 28.41 | .4689 | .000926 |
| 1.497 | 6.882 | 6406. | .9311 | .9812 | .9400 | 28.58 | .4512 | .000952 |
| 1.526 | 7.016 | 6531. | .9334 | .9818 | .9420 | 28.64 | .4334 | .000978 |
| 1.563 | 7.185 | 6689. | .9371 | .9828 | .9453 | 28.75 | .4109 | .001010 |
| 1.602 | 7.347 | 6857. | .9416 | .9840 | .9493 | 28.88 | .3866 | .001044 |
| 1.640 | 7.542 | 7020. | .9475 | .9856 | .9544 | 29.04 | .3634 | .001077 |
| 1.672 | 7.687 | 7156. | .9503 | .9863 | .9568 | 29.12 | .3440 | .001104 |
| 1.709 | 7.857 | 7314. | .9535 | .9872 | .9597 | 29.21 | .3215 | .001135 |
| 1.743 | 8.015 | 7461. | .9578 | .9883 | .9634 | 29.33 | .3007 | .001164 |
| 1.780 | 8.184 | 7618. | .9627 | .9896 | .9677 | 29.46 | .2785 | .001194 |
| 1.809 | 8.312 | 7737. | .9667 | .9907 | .9712 | 29.58 | .2620 | .001217 |
| 1.846 | 8.487 | 7900. | .9685 | .9912 | .9728 | 29.63 | .2395 | .001248 |
| 1.884 | 8.586 | 7993. | .9701 | .9917 | .9742 | 29.67 | .2270 | .001264 |
| 1.905 | 8.756 | 8151. | .9735 | .9926 | .9771 | 29.77 | .2059 | .001293 |
| 1.938 | 8.908 | 8292. | .9775 | .9937 | .9806 | 29.88 | .1874 | .001318 |
| 1.971 | 9.059 | 8433. | .9789 | .9941 | .9818 | 29.92 | .1694 | .001342 |
| 2.001 | 9.200 | 8564. | .9816 | .9948 | .9842 | 29.99 | .1530 | .001364 |
| 2.029 | 9.328 | 8683. | .9838 | .9954 | .9860 | 30.05 | .1384 | .001383 |
| 2.067 | 9.503 | 8846. | .9857 | .9960 | .9877 | 30.10 | .1191 | .001408 |
| 2.099 | 9.649 | 8982. | .9876 | .9965 | .9893 | 30.16 | .1035 | .001429 |
| 2.123 | 9.760 | 9085. | .9897 | .9969 | .9907 | 30.20 | .0921 | .001444 |
| 2.160 | 9.929 | 9243. | .9897 | .9971 | .9911 | 30.21 | .0753 | .001466 |
| 2.192 | 10.075 | 9379. | .9920 | .9977 | .9931 | 30.28 | .0615 | .001484 |
| 2.221 | 10.210 | 9504. | .9932 | .9980 | .9941 | 30.31 | .0493 | .001500 |
| 2.245 | 10.320 | 9607. | .9948 | .9985 | .9955 | 30.35 | .0397 | .001512 |
| 2.272 | 10.443 | 9721. | .9943 | .9984 | .9951 | 30.34 | .0296 | .001525 |
| 2.310 | 10.618 | 9884. | .9955 | .9987 | .9961 | 30.37 | .0158 | .001543 |
| 2.341 | 10.764 | 10020. | .9965 | .9990 | .9970 | 30.40 | .0055 | .001556 |
| 2.371 | 10.898 | 10145. | .9973 | .9992 | .9977 | 30.42 | 0.0000 | .001564 |
| 2.397 | 11.021 | 10259. | .9982 | .9995 | .9985 | 30.45 | 0.0000 | .001564 |
| 2.473 | 11.371 | 10585. | .9986 | .9996 | .9988 | 30.46 | 0.0000 | .001564 |
| 2.537 | 11.663 | 10857. | .9995 | .9998 | .9996 | 30.49 | 0.0000 | .001564 |
| 2.600 | 11.955 | 11128. | .9989 | .9997 | .9990 | 30.47 | 0.0000 | .001564 |
| 2.654 | 12.200 | 11357. | .9995 | .9998 | .9996 | 30.49 | 0.0000 | .001564 |
| 2.724 | 12.521 | 11656. | .9995 | .9998 | .9996 | 30.49 | 0.0000 | .001564 |
| 2.796 | 12.854 | 11965. | .9995 | .9998 | .9996 | 30.49 | 0.0000 | .001564 |
| 2.862 | 13.157 | 12248. | .9993 | .9998 | .9994 | 30.48 | 0.0000 | .001564 |
| 2.933 | 13.485 | 12552. | 1.0011 | 1.0003 | 1.0010 | 30.53 | 0.0000 | .001564 |
| 2.999 | 13.788 | 12835. | .9993 | .9998 | .9994 | 30.48 | 0.0000 | .001564 |
| 3.063 | 14.080 | 13107. | .9997 | .9999 | .9997 | 30.49 | 0.0000 | .001564 |
| 3.124 | 14.360 | 13368. | .9992 | .9997 | .9993 | 30.48 | 0.0000 | .001564 |
| 3.147 | 14.465 | 13465. | 1.0005 | 1.0001 | 1.0004 | 30.51 | 0.0000 | .001564 |
| 3.187 | 14.652 | 13639. | .9994 | .9998 | .9995 | 30.48 | 0.0000 | .001564 |
| 3.235 | 14.874 | 13846. | 1.0001 | 1.0000 | 1.0001 | 30.50 | 0.0000 | .001564 |

TABLE A10. (CONT.)
PROFILE - JPL-3 - - - PITOT PRESSURE DATA

EDGE MACH NO.= .9613 TOTAL PRESSURE= .1338E+06 N/M**2
X= -7.67 CM TOTAL TEMPRATUR= 328.06 DEG-K

UE= 321.05 M/SEC DELTA STAR= .3667 CM THETA= .2273 CM H= 1.613
RE-DELTA-STAR= 62.110. RF-THETA= 38500. NUWALL= .2483 CM**2/SEC

LEAST SQUARE FIT PARAMETERS
UTAH= 10.8227 M/SEC CF= .001953 PI= .5501 DELTA= 2.5515 CM
CHISQR= .2948E-04 YMAX= 2.418 CM YMIN= .038 CM

| Y (CM) | Y/THETA | Y-PLUS | M/ME | RHO/RHOF | U/UE | U-PLUS | TAU/TAU-MAX | V/U |
|--------|---------|--------|--------|----------|--------|--------|-------------|----------|
| 0.000 | 0.000 | 0. | 0.0000 | .8594 | 0.0000 | 0.00 | 1.0000 | 0.000000 |
| .010 | .044 | 44. | .4647 | .8897 | .4927 | 14.70 | 1.0000 | 0.000000 |
| .021 | .094 | 94. | .5254 | .8982 | .5544 | 16.56 | .9990 | .000004 |
| .030 | .134 | 132. | .5568 | .9029 | .5859 | 17.52 | .9982 | .000007 |
| .038 | .167 | 166. | .5808 | .9068 | .6099 | 18.25 | .9974 | .000010 |
| .050 | .223 | 221. | .5991 | .9098 | .6280 | 18.80 | .9960 | .000015 |
| .066 | .290 | 287. | .6135 | .9123 | .6424 | 19.24 | .9942 | .000020 |
| .085 | .374 | 370. | .6295 | .9151 | .6581 | 19.72 | .9918 | .000027 |
| .104 | .448 | 453. | .6444 | .9178 | .6727 | 20.17 | .9893 | .000034 |
| .110 | .486 | 481. | .6465 | .9181 | .6747 | 20.23 | .9884 | .000037 |
| .123 | .541 | 536. | .6601 | .9206 | .6880 | 20.64 | .9867 | .000042 |
| .142 | .625 | 619. | .6628 | .9211 | .6906 | 20.72 | .9839 | .000049 |
| .152 | .670 | 664. | .6799 | .9243 | .7071 | 21.23 | .9824 | .000053 |
| .192 | .804 | 797. | .6857 | .9255 | .7129 | 21.40 | .9776 | .000064 |
| .209 | .921 | 913. | .6950 | .9273 | .7217 | 21.68 | .9733 | .000075 |
| .237 | 1.044 | 1035. | .7045 | .9292 | .7309 | 21.96 | .9685 | .000086 |
| .259 | 1.184 | 1173. | .7158 | .9314 | .7417 | 22.29 | .9629 | .000098 |
| .294 | 1.296 | 1284. | .7225 | .9328 | .7481 | 22.49 | .9582 | .000109 |
| .325 | 1.430 | 1417. | .7283 | .9339 | .7536 | 22.66 | .9523 | .000121 |
| .354 | 1.558 | 1544. | .7389 | .9361 | .7636 | 22.97 | .9465 | .000134 |
| .393 | 1.731 | 1716. | .7479 | .9380 | .7722 | 23.24 | .9383 | .000151 |
| .415 | 1.826 | 1810. | .7538 | .9393 | .7778 | 23.41 | .9337 | .000160 |
| .440 | 2.111 | 2092. | .7646 | .9416 | .7880 | 23.73 | .9190 | .000189 |
| .506 | 2.228 | 2208. | .7731 | .9434 | .7960 | 23.97 | .9126 | .000202 |
| .541 | 2.379 | 2358. | .7746 | .9437 | .7974 | 24.02 | .9040 | .000218 |
| .563 | 2.480 | 2457. | .7841 | .9458 | .8062 | 24.29 | .8982 | .000230 |
| .594 | 2.614 | 2590. | .7860 | .9462 | .8090 | 24.35 | .8901 | .000245 |
| .617 | 2.714 | 2690. | .7910 | .9473 | .8127 | 24.49 | .8839 | .000256 |
| .645 | 2.837 | 2812. | .7950 | .9482 | .8164 | 24.61 | .8761 | .000271 |
| .671 | 2.955 | 2928. | .8002 | .9494 | .8212 | 24.76 | .8684 | .000285 |
| .707 | 3.111 | 3083. | .8083 | .9512 | .8287 | 24.99 | .8578 | .000304 |
| .739 | 3.251 | 3221. | .8100 | .9516 | .8303 | 25.04 | .8480 | .000322 |
| .765 | 3.368 | 3337. | .8155 | .9529 | .8354 | 25.20 | .8395 | .000337 |
| .800 | 3.519 | 3487. | .8208 | .9541 | .8403 | 25.36 | .8282 | .000357 |
| .833 | 3.664 | 3631. | .8263 | .9554 | .8454 | 25.52 | .8170 | .000376 |
| .859 | 3.781 | 3747. | .8307 | .9563 | .8490 | 25.63 | .8077 | .000392 |
| .849 | 3.910 | 3874. | .8331 | .9570 | .8516 | 25.71 | .7973 | .000410 |
| .919 | 4.044 | 4007. | .8408 | .9588 | .8547 | 25.93 | .7860 | .000429 |
| .944 | 4.156 | 4118. | .8471 | .9591 | .8599 | 25.97 | .7765 | .000446 |
| .970 | 4.257 | 4229. | .8459 | .9600 | .8633 | 26.08 | .7667 | .000462 |
| .995 | 4.379 | 4339. | .8502 | .9610 | .8673 | 26.20 | .7566 | .000479 |

| Y (CM) | Y/THETA | Y-PLUS | TABLE A10. (CONT.) M/ME | RHO/RH0E | U/UE | U-PLUS | TAU/TAU-MAX | V/U |
|--------|---------|--------|----------------------------|----------|--------|--------|-------------|---------|
| 1.033 | 4.547 | 4505. | .8557 | .9623 | .8722 | 26.36 | .7412 | .000504 |
| 1.045 | 4.684 | 4644. | .8597 | .9633 | .8759 | 26.47 | .7280 | .000526 |
| 1.094 | 4.815 | 4771. | .8676 | .9652 | .8831 | 26.70 | .7156 | .000546 |
| 1.132 | 4.993 | 4937. | .8720 | .9663 | .8871 | 26.82 | .6990 | .000573 |
| 1.168 | 5.139 | 5092. | .8740 | .9668 | .8889 | 26.88 | .6831 | .000598 |
| 1.191 | 5.239 | 5192. | .8796 | .9681 | .8939 | 27.04 | .6727 | .000614 |
| 1.228 | 5.401 | 5352. | .8847 | .9694 | .8985 | 27.18 | .6556 | .000641 |
| 1.264 | 5.564 | 5513. | .8857 | .9697 | .8995 | 27.21 | .6391 | .000669 |
| 1.297 | 5.709 | 5657. | .8908 | .9709 | .9040 | 27.36 | .6221 | .000693 |
| 1.324 | 5.826 | 5773. | .8953 | .9721 | .9080 | 27.48 | .6090 | .000713 |
| 1.356 | 5.966 | 5912. | .8979 | .9727 | .9104 | 27.56 | .5931 | .000738 |
| 1.393 | 6.128 | 6072. | .9056 | .9747 | .9172 | 27.77 | .5745 | .000766 |
| 1.455 | 6.401 | 6343. | .9139 | .9768 | .9246 | 28.01 | .5422 | .000814 |
| 1.494 | 6.530 | 6471. | .9163 | .9774 | .9268 | 28.08 | .5269 | .000837 |
| 1.521 | 6.692 | 6631. | .9214 | .9787 | .9313 | 28.22 | .5073 | .000866 |
| 1.554 | 6.837 | 6775. | .9235 | .9793 | .9332 | 28.28 | .4895 | .000892 |
| 1.581 | 6.955 | 6891. | .9278 | .9804 | .9370 | 28.40 | .4751 | .000913 |
| 1.617 | 7.117 | 7052. | .9310 | .9812 | .9398 | 28.49 | .4550 | .000947 |
| 1.647 | 7.245 | 7179. | .9350 | .9823 | .9433 | 28.60 | .4390 | .000965 |
| 1.681 | 7.396 | 7329. | .9386 | .9832 | .9466 | 28.70 | .4198 | .000993 |
| 1.706 | 7.508 | 7439. | .9412 | .9839 | .9488 | 28.77 | .4061 | .001012 |
| 1.737 | 7.642 | 7572. | .9447 | .9848 | .9519 | 28.87 | .3892 | .001036 |
| 1.770 | 7.787 | 7716. | .9468 | .9854 | .9538 | 28.93 | .3709 | .001067 |
| 1.805 | 7.943 | 7871. | .9517 | .9867 | .9580 | 29.07 | .3513 | .001090 |
| 1.841 | 8.100 | 8026. | .9552 | .9877 | .9612 | 29.16 | .3316 | .001117 |
| 1.869 | 8.223 | 8148. | .9574 | .9883 | .9631 | 29.23 | .3163 | .001138 |
| 1.889 | 8.312 | 8236. | .9605 | .9891 | .9658 | 29.31 | .3052 | .001154 |
| 1.917 | 8.435 | 8358. | .9625 | .9896 | .9675 | 29.37 | .2899 | .001175 |
| 1.985 | 8.731 | 8652. | .9688 | .9913 | .9730 | 29.54 | .2537 | .001225 |
| 2.012 | 8.854 | 8773. | .9717 | .9921 | .9756 | 29.62 | .2389 | .001245 |
| 2.045 | 8.999 | 8917. | .9727 | .9924 | .9764 | 29.65 | .2216 | .001268 |
| 2.073 | 9.122 | 9039. | .9765 | .9934 | .9797 | 29.75 | .2072 | .001288 |
| 2.103 | 9.250 | 9166. | .9778 | .9938 | .9809 | 29.79 | .1923 | .001308 |
| 2.132 | 9.379 | 9294. | .9787 | .9940 | .9816 | 29.82 | .1776 | .001327 |
| 2.160 | 9.502 | 9416. | .9814 | .9948 | .9839 | 29.89 | .1639 | .001346 |
| 2.186 | 9.619 | 9532. | .9843 | .9956 | .9865 | 29.97 | .1510 | .001363 |
| 2.221 | 9.770 | 9681. | .9860 | .9960 | .9870 | 30.02 | .1347 | .001385 |
| 2.255 | 9.921 | 9831. | .9862 | .9961 | .9881 | 30.02 | .1190 | .001406 |
| 2.288 | 10.066 | 9975. | .9873 | .9964 | .9891 | 30.05 | .1042 | .001425 |
| 2.313 | 10.178 | 10085. | .9903 | .9973 | .9917 | 30.14 | .0937 | .001440 |
| 2.349 | 10.334 | 10240. | .9913 | .9975 | .9925 | 30.16 | .0782 | .001459 |
| 2.392 | 10.524 | 10429. | .9927 | .9979 | .9938 | 30.20 | .0609 | .001482 |
| 2.418 | 10.636 | 10539. | .9935 | .9982 | .9944 | 30.23 | .0511 | .001495 |
| 2.452 | 10.787 | 10689. | .9947 | .9985 | .9955 | 30.26 | .0384 | .001511 |
| 2.481 | 10.915 | 10816. | .9956 | .9987 | .9967 | 30.28 | .0287 | .001525 |
| 2.520 | 11.088 | 10988. | .9963 | .9989 | .9968 | 30.30 | .0151 | .001542 |
| 2.540 | 11.217 | 11115. | .9963 | .9989 | .9968 | 30.30 | .0060 | .001554 |
| 2.594 | 11.368 | 11264. | .9972 | .9992 | .9976 | 30.33 | 0.0000 | .001561 |
| 2.694 | 11.854 | 11746. | .9991 | .9997 | .9992 | 30.38 | 0.0000 | .001561 |
| 2.951 | 12.982 | 12864. | .9996 | .9998 | .9996 | 30.39 | 0.0000 | .001561 |
| 3.027 | 13.317 | 13196. | 1.0004 | 1.0001 | 1.0003 | 30.41 | 0.0000 | .001561 |
| 3.378 | 14.859 | 14724. | 1.0002 | 1.0000 | 1.0002 | 30.41 | 0.0000 | .001561 |
| 3.418 | 15.038 | 14901. | .9994 | .9998 | .9995 | 30.39 | 0.0000 | .001561 |
| 3.489 | 15.351 | 15211. | .9987 | .9996 | .9989 | 30.37 | 0.0000 | .001561 |

TABLE A10. (CONT.)
PROFILE - JPL-4 - - - PITOT PRESSURE DATA

EDGE MACH NO.= .9637 TOTAL PRESSURE= .1330E+06 N/M**2
X= 0.00 CM TOTAL TEMPERATURE= 330.01 DEG-K

UE= 322.66 M/SEC DELTA STAR= .3894 CM THETA= .2386 CM H= 1.631
RE-IFLTA-STAR= 65100. RE-THETA= 39900. NUWALL= .2528 CM**2/SEC CF= .001947

LEAST SQUARE FIT PARAMETERS
UTAU= 10.8043 M/SEC CF= .001925 PI= .5887 DELTA= 2.6280 CM
CHISQR= .9616E-05 YMAX= 2.465 CM YMIN= .036 CM

| Y (CM) | Y/THETA | Y-PLUS | M/ME | RHO/RHOE | U/UF | U-PLUS | TAU/TAU-MAX | V/U |
|--------|---------|--------|--------|----------|--------|--------|-------------|----------|
| 0.000 | 0.000 | 0. | 0.0000 | .8588 | 0.0000 | 0.00 | 1.0000 | 0.000000 |
| .010 | .042 | 43. | .4300 | .8849 | .4571 | 13.72 | 1.0000 | 0.000000 |
| .022 | .095 | 97. | .5027 | .8944 | .5315 | 15.98 | .9990 | .000004 |
| .036 | .154 | 157. | .5549 | .9022 | .5842 | 17.59 | .9977 | .000009 |
| .048 | .202 | 206. | .5823 | .9067 | .6116 | 18.43 | .9966 | .000013 |
| .072 | .303 | 309. | .6044 | .9103 | .6334 | 19.10 | .9939 | .000021 |
| .093 | .393 | 401. | .6250 | .9139 | .6538 | 19.72 | .9913 | .000029 |
| .114 | .478 | 488. | .6443 | .9174 | .6726 | 20.30 | .9888 | .000036 |
| .138 | .579 | 591. | .6595 | .9202 | .6875 | 20.76 | .9855 | .000044 |
| .163 | .684 | 700. | .6739 | .9229 | .7014 | 21.19 | .9820 | .000053 |
| .189 | .792 | 808. | .6789 | .9239 | .7064 | 21.35 | .9782 | .000062 |
| .213 | .893 | 911. | .6896 | .9259 | .7166 | 21.67 | .9745 | .000071 |
| .232 | .973 | 993. | .6995 | .9278 | .7261 | 21.96 | .9715 | .000078 |
| .257 | 1.080 | 1101. | .7072 | .9294 | .7336 | 22.19 | .9673 | .000088 |
| .278 | 1.165 | 1188. | .7115 | .9302 | .7377 | 22.32 | .9639 | .000095 |
| .299 | 1.255 | 1280. | .7220 | .9324 | .7477 | 22.63 | .9601 | .000104 |
| .331 | 1.388 | 1416. | .7272 | .9334 | .7526 | 22.78 | .9544 | .000116 |
| .365 | 1.532 | 1563. | .7409 | .9363 | .7657 | 23.19 | .9479 | .000130 |
| .394 | 1.654 | 1688. | .7396 | .9360 | .7645 | 23.15 | .9472 | .000141 |
| .420 | 1.741 | 1796. | .7483 | .9378 | .7727 | 23.41 | .9371 | .000152 |
| .443 | 1.857 | 1894. | .7538 | .9390 | .7779 | 23.57 | .9373 | .000162 |
| .473 | 1.984 | 2074. | .7586 | .9400 | .7824 | 23.71 | .9258 | .000175 |
| .504 | 2.112 | 2154. | .7645 | .9413 | .7880 | 23.89 | .9189 | .000188 |
| .524 | 2.197 | 2241. | .7666 | .9417 | .7899 | 23.95 | .9143 | .000197 |
| .551 | 2.309 | 2355. | .7701 | .9425 | .7932 | 24.05 | .9080 | .000209 |
| .585 | 2.452 | 2502. | .7801 | .9447 | .8026 | 24.34 | .8996 | .000225 |
| .613 | 2.570 | 2621. | .7878 | .9464 | .8098 | 24.57 | .8925 | .000238 |
| .646 | 2.708 | 2762. | .7909 | .9471 | .8127 | 24.66 | .8838 | .000255 |
| .679 | 2.846 | 2903. | .7952 | .9481 | .8167 | 24.79 | .8748 | .000271 |
| .712 | 2.985 | 3044. | .8028 | .9498 | .8237 | 25.01 | .8655 | .000288 |
| .745 | 3.123 | 3186. | .8058 | .9505 | .8265 | 25.10 | .8558 | .000305 |
| .776 | 3.293 | 3359. | .8116 | .9518 | .8319 | 25.26 | .8435 | .000327 |
| .821 | 3.442 | 3511. | .8168 | .9530 | .8367 | 25.42 | .8323 | .000347 |
| .842 | 3.612 | 3685. | .8260 | .9551 | .8452 | 25.68 | .8190 | .000370 |
| .899 | 3.767 | 3842. | .8289 | .9558 | .8478 | 25.76 | .8065 | .000391 |
| .942 | 3.948 | 4027. | .8377 | .9579 | .8559 | 26.02 | .7912 | .000417 |
| .976 | 4.091 | 4173. | .8405 | .9585 | .8585 | 26.10 | .7787 | .000438 |
| 1.014 | 4.251 | 4336. | .8475 | .9602 | .8649 | 26.30 | .7644 | .000462 |
| 1.052 | 4.411 | 4499. | .8533 | .9616 | .8702 | 26.47 | .7495 | .000486 |
| 1.097 | 4.597 | 4689. | .8585 | .9628 | .8749 | 26.62 | .7316 | .000515 |
| 1.134 | 4.751 | 4847. | .8623 | .9638 | .8784 | 26.73 | .7163 | .000540 |

| TABLE A10. (CONT.) | | | | | | | | |
|--------------------|---------|--------|--------|----------|--------|--------|-------------|---------|
| Y (CM) | Y/THETA | Y-PLUS | M/ME | RHO/RHOE | U/UE | U-PLUS | TAU/TAU-MAX | V/U |
| 1.164 | 4.879 | 4977. | .8689 | .9654 | .8843 | 26.92 | .7035 | .000561 |
| 1.196 | 5.017 | 5112. | .8738 | .9666 | .8888 | 27.06 | .6897 | .000562 |
| 1.230 | 5.155 | 5259. | .8787 | .9678 | .8932 | 27.20 | .6745 | .000606 |
| 1.263 | 5.294 | 5400. | .8817 | .9685 | .8959 | 27.28 | .6595 | .000630 |
| 1.289 | 5.400 | 5509. | .8855 | .9695 | .8993 | 27.39 | .6478 | .000648 |
| 1.327 | 5.539 | 5650. | .8908 | .9708 | .9041 | 27.55 | .6323 | .000671 |
| 1.369 | 5.735 | 5851. | .8954 | .9720 | .9082 | 27.68 | .6098 | .000706 |
| 1.405 | 5.890 | 6008. | .8997 | .9729 | .9116 | 27.78 | .5918 | .000733 |
| 1.437 | 6.023 | 6144. | .9023 | .9737 | .9144 | 27.87 | .5760 | .000757 |
| 1.474 | 6.177 | 6301. | .9084 | .9753 | .9198 | 28.05 | .5575 | .000784 |
| 1.511 | 6.331 | 6459. | .9128 | .9764 | .9238 | 28.17 | .5383 | .000813 |
| 1.543 | 6.464 | 6594. | .9174 | .9776 | .9279 | 28.30 | .5222 | .000836 |
| 1.576 | 6.603 | 6735. | .9206 | .9784 | .9307 | 28.39 | .5050 | .000861 |
| 1.609 | 6.741 | 6877. | .9238 | .9793 | .9335 | 28.48 | .4874 | .000887 |
| 1.644 | 6.890 | 7028. | .9266 | .9800 | .9360 | 28.56 | .4687 | .000914 |
| 1.690 | 7.039 | 7180. | .9310 | .9811 | .9398 | 28.68 | .4496 | .000941 |
| 1.713 | 7.177 | 7322. | .9348 | .9822 | .9432 | 28.79 | .4319 | .000966 |
| 1.751 | 7.337 | 7484. | .9392 | .9833 | .9472 | 28.92 | .4113 | .000995 |
| 1.786 | 7.486 | 7636. | .9430 | .9843 | .9504 | 29.02 | .3921 | .001022 |
| 1.819 | 7.624 | 7778. | .9453 | .9849 | .9525 | 29.09 | .3742 | .001047 |
| 1.855 | 7.773 | 7930. | .9491 | .9860 | .9559 | 29.20 | .3550 | .001074 |
| 1.896 | 7.944 | 8103. | .9544 | .9874 | .9604 | 29.34 | .3330 | .001104 |
| 1.929 | 8.082 | 8244. | .9582 | .9884 | .9638 | 29.45 | .3153 | .001129 |
| 1.960 | 8.215 | 8380. | .9612 | .9892 | .9664 | 29.53 | .2983 | .001152 |
| 2.002 | 8.391 | 8559. | .9657 | .9903 | .9699 | 29.65 | .2761 | .001182 |
| 2.032 | 8.513 | 8684. | .9666 | .9907 | .9711 | 29.68 | .2608 | .001203 |
| 2.068 | 8.657 | 8841. | .9680 | .9911 | .9723 | 29.72 | .2417 | .001229 |
| 2.101 | 8.806 | 8983. | .9716 | .9921 | .9754 | 29.82 | .2247 | .001251 |
| 2.134 | 8.944 | 9124. | .9737 | .9925 | .9768 | 29.87 | .2081 | .001274 |
| 2.171 | 9.098 | 9281. | .9773 | .9936 | .9804 | 29.98 | .1898 | .001298 |
| 2.208 | 9.253 | 9438. | .9792 | .9942 | .9821 | 30.04 | .1719 | .001327 |
| 2.244 | 9.402 | 9590. | .9827 | .9951 | .9851 | 30.13 | .1550 | .001344 |
| 2.280 | 9.556 | 9748. | .9838 | .9954 | .9860 | 30.16 | .1380 | .001366 |
| 2.317 | 9.710 | 9905. | .9862 | .9961 | .9881 | 30.23 | .1215 | .001388 |
| 2.363 | 9.902 | 10101. | .9874 | .9964 | .9891 | 30.26 | .1017 | .001414 |
| 2.396 | 10.040 | 10242. | .9890 | .9969 | .9906 | 30.31 | .0879 | .001432 |
| 2.434 | 10.200 | 10405. | .9916 | .9976 | .9927 | 30.38 | .0727 | .001451 |
| 2.465 | 10.327 | 10535. | .9926 | .9979 | .9937 | 30.41 | .0607 | .001467 |
| 2.503 | 10.487 | 10698. | .9945 | .9984 | .9952 | 30.46 | .0471 | .001484 |
| 2.546 | 10.668 | 10882. | .9944 | .9984 | .9951 | 30.46 | .0322 | .001504 |
| 2.581 | 10.817 | 11034. | .9963 | .9989 | .9968 | 30.51 | .0207 | .001518 |
| 2.627 | 11.009 | 11230. | .9970 | .9991 | .9974 | 30.53 | .0070 | .001536 |
| 2.668 | 11.179 | 11403. | .9979 | .9994 | .9982 | 30.55 | 0.0000 | .001545 |
| 2.705 | 11.333 | 11561. | .9984 | .9995 | .9986 | 30.57 | 0.0000 | .001545 |
| 2.787 | 11.679 | 11914. | 1.0000 | 1.0000 | 1.0000 | 30.61 | 0.0000 | .001545 |
| 2.843 | 11.998 | 12239. | 1.0002 | 1.0000 | 1.0002 | 30.62 | 0.0000 | .001545 |
| 2.937 | 12.307 | 12554. | .9991 | .9997 | .9992 | 30.59 | 0.0000 | .001545 |
| 3.026 | 12.679 | 12934. | 1.0000 | 1.0000 | 1.0000 | 30.61 | 0.0000 | .001545 |
| 3.107 | 12.999 | 13260. | 1.0001 | 1.0000 | 1.0001 | 30.62 | 0.0000 | .001545 |
| 3.178 | 13.318 | 13585. | 1.0000 | 1.0000 | 1.0000 | 30.61 | 0.0000 | .001545 |
| 3.257 | 13.626 | 13900. | 1.0007 | 1.0002 | 1.0006 | 30.63 | 0.0000 | .001545 |
| 3.356 | 14.063 | 14345. | .9997 | .9999 | .9997 | 30.40 | 0.0000 | .001545 |
| 3.445 | 14.435 | 14725. | .9999 | .9999 | .9999 | 30.61 | 0.0000 | .001545 |
| 3.483 | 14.595 | 14889. | 1.0005 | 1.0001 | 1.0004 | 30.63 | 0.0000 | .001545 |
| 3.602 | 15.095 | 15398. | 1.0001 | 1.0000 | 1.0001 | 30.61 | 0.0000 | .001545 |
| 3.691 | 15.467 | 15778. | .9999 | .9999 | .9999 | 30.61 | 0.0000 | .001545 |

TABLE A10. (CONT.)
 PROFILE - JPL-5 - - - PITOT PRESSURE DATA

EDGE MACH NO.= .9606 TOTAL PRESSURE= .1331E+06 N/M**2
 X= 7.62 CM TOTAL TEMPERATURE= 330.49 DEG-K

UE= 327.04 M/SEC DELTA STAR= .4076 CM THETA= .2505 CM H= 1.627
 RE-DELTA-STAR= 67630. RE-THETA= 41550. NUWALL= .2521 CM**2/SEC

LFAST SQUARE FIT PARAMETERS
 UTAU= 10.7382 M/SEC CF= .001911 PI= .5925 DELTA= 2.7502 CM
 CHISQR= .1221E-04 YMAX= 2.603 CM YMIN= .038 CM

| Y (CM) | Y/THETA | Y-PLUS | M/ME | RHO/RHME | U/UE | U-PLUS | TAU/TAU-MAX | V/U |
|--------|---------|--------|--------|----------|--------|--------|-------------|----------|
| 0.000 | 0.000 | 0. | 0.0000 | .8595 | 0.0000 | 0.00 | 1.0000 | 0.000000 |
| .010 | .040 | 43. | .4301 | .8855 | .4571 | 13.77 | 1.0000 | 0.000000 |
| .011 | .045 | 48. | .4526 | .8883 | .4803 | 14.48 | .9999 | 0.000000 |
| .021 | .086 | 91. | .5081 | .8958 | .5368 | 16.21 | .9991 | .000003 |
| .038 | .152 | 162. | .5481 | .9017 | .5772 | 17.44 | .9977 | .000009 |
| .052 | .207 | 221. | .5784 | .9065 | .6075 | 18.38 | .9963 | .000013 |
| .068 | .273 | 292. | .5992 | .9100 | .6281 | 19.01 | .9946 | .000019 |
| .081 | .324 | 346. | .6218 | .9138 | .6505 | 19.70 | .9932 | .000023 |
| .104 | .415 | 443. | .6342 | .9160 | .6626 | 20.08 | .9906 | .000031 |
| .127 | .506 | 540. | .6503 | .9189 | .6784 | 20.57 | .9877 | .000038 |
| .144 | .577 | 616. | .6600 | .9207 | .6878 | 20.86 | .9854 | .000044 |
| .197 | .730 | 778. | .6734 | .9232 | .7008 | 21.26 | .9802 | .000057 |
| .213 | .851 | 908. | .6918 | .9267 | .7186 | 21.82 | .9758 | .000068 |
| .236 | .942 | 1006. | .7016 | .9287 | .7281 | 22.11 | .9724 | .000075 |
| .266 | 1.064 | 1136. | .7092 | .9302 | .7353 | 22.34 | .9676 | .000086 |
| .292 | 1.166 | 1244. | .7157 | .9315 | .7416 | 22.53 | .9635 | .000095 |
| .332 | 1.328 | 1417. | .7223 | .9328 | .7479 | 22.73 | .9566 | .000110 |
| .365 | 1.460 | 1557. | .7324 | .9349 | .7575 | 23.03 | .9507 | .000123 |
| .398 | 1.591 | 1698. | .7404 | .9365 | .7651 | 23.27 | .9446 | .000135 |
| .434 | 1.733 | 1850. | .7448 | .9374 | .7693 | 23.40 | .9378 | .000149 |
| .471 | 1.880 | 2006. | .7556 | .9397 | .7794 | 23.72 | .9304 | .000164 |
| .509 | 2.032 | 2169. | .7578 | .9402 | .7815 | 23.78 | .9224 | .000180 |
| .546 | 2.179 | 2326. | .7704 | .9429 | .7934 | 24.16 | .9144 | .000195 |
| .581 | 2.321 | 2477. | .7734 | .9435 | .7962 | 24.24 | .9063 | .000211 |
| .612 | 2.443 | 2607. | .7765 | .9442 | .7991 | 24.33 | .8991 | .000224 |
| .646 | 2.580 | 2753. | .7868 | .9465 | .8087 | 24.64 | .8907 | .000240 |
| .678 | 2.707 | 2888. | .7917 | .9476 | .8133 | 24.78 | .8827 | .000254 |
| .716 | 2.859 | 3050. | .7944 | .9482 | .8158 | 24.86 | .8727 | .000273 |
| .758 | 3.026 | 3229. | .8050 | .9505 | .8256 | 25.17 | .8612 | .000293 |
| .791 | 3.158 | 3370. | .8068 | .9510 | .8274 | 25.23 | .8518 | .000310 |
| .835 | 3.335 | 3559. | .8129 | .9523 | .8330 | 25.40 | .8387 | .000333 |
| .871 | 3.477 | 3710. | .8213 | .9543 | .8407 | 25.65 | .8278 | .000352 |
| .906 | 3.619 | 3862. | .8253 | .9552 | .8444 | 25.76 | .8165 | .000371 |
| .937 | 3.741 | 3992. | .8314 | .9566 | .8501 | 25.94 | .8065 | .000388 |
| .971 | 3.878 | 4138. | .8359 | .9577 | .8542 | 26.07 | .7950 | .000407 |
| 1.000 | 3.994 | 4262. | .8386 | .9583 | .8566 | 26.15 | .7849 | .000424 |
| 1.033 | 4.126 | 4403. | .8424 | .9592 | .8601 | 26.26 | .7732 | .000444 |
| 1.078 | 4.304 | 4592. | .8473 | .9604 | .8646 | 26.40 | .7569 | .000470 |
| 1.121 | 4.476 | 4776. | .8563 | .9625 | .8728 | 26.66 | .7405 | .000497 |
| 1.165 | 4.653 | 4965. | .8597 | .9633 | .8759 | 26.76 | .7231 | .000525 |
| 1.206 | 4.816 | 5139. | .8668 | .9650 | .8823 | 26.97 | .7067 | .000551 |

| Y (CM) | Y/THETA | Y-PLUS | TABLE A10. M/ME | (CONT.) RHO/RHNE | U/UE | I-PLUS | TAU/TAU-MAX | V/U |
|--------|---------|--------|--------------------|---------------------|--------|--------|-------------|---------|
| 1.253 | 5.003 | 5339. | .8711 | .9661 | .8863 | 27.09 | .6872 | .000582 |
| 1.297 | 5.181 | 5528. | .8751 | .9671 | .8898 | 27.20 | .6681 | .000611 |
| 1.339 | 5.348 | 5707. | .8840 | .9693 | .8979 | 27.46 | .6497 | .000639 |
| 1.383 | 5.520 | 5891. | .8888 | .9705 | .9022 | 27.60 | .6303 | .000669 |
| 1.419 | 5.667 | 6047. | .8936 | .9717 | .9065 | 27.74 | .6134 | .000695 |
| 1.466 | 5.855 | 6248. | .9003 | .9734 | .9125 | 27.93 | .5913 | .000728 |
| 1.511 | 6.032 | 6437. | .9057 | .9746 | .9169 | 28.07 | .5701 | .000759 |
| 1.550 | 6.190 | 6605. | .9092 | .9756 | .9204 | 28.18 | .5509 | .000788 |
| 1.602 | 6.397 | 6826. | .9142 | .9769 | .9250 | 28.32 | .5250 | .000825 |
| 1.635 | 6.529 | 6967. | .9173 | .9777 | .9277 | 28.41 | .5087 | .000849 |
| 1.671 | 6.671 | 7118. | .9223 | .9790 | .9322 | 28.55 | .4907 | .000875 |
| 1.724 | 6.884 | 7346. | .9286 | .9806 | .9377 | 28.73 | .4635 | .000914 |
| 1.771 | 7.072 | 7546. | .9321 | .9815 | .9408 | 28.83 | .4393 | .000948 |
| 1.808 | 7.219 | 7703. | .9372 | .9829 | .9453 | 28.98 | .4198 | .000975 |
| 1.854 | 7.401 | 7897. | .9412 | .9839 | .9489 | 29.09 | .3964 | .001008 |
| 1.879 | 7.503 | 8006. | .9433 | .9845 | .9507 | 29.15 | .3832 | .001027 |
| 1.917 | 7.655 | 8168. | .9468 | .9854 | .9538 | 29.25 | .3633 | .001054 |
| 1.960 | 7.827 | 8352. | .9540 | .9874 | .9601 | 29.45 | .3409 | .001085 |
| 2.006 | 8.010 | 8547. | .9549 | .9876 | .9609 | 29.47 | .3172 | .001117 |
| 2.048 | 8.177 | 8725. | .9603 | .9890 | .9656 | 29.63 | .2953 | .001147 |
| 2.092 | 8.314 | 8871. | .9637 | .9899 | .9685 | 29.72 | .2781 | .001170 |
| 2.128 | 8.496 | 9066. | .9665 | .9907 | .9710 | 29.80 | .2550 | .001201 |
| 2.166 | 8.648 | 9228. | .9680 | .9911 | .9723 | 29.84 | .2360 | .001226 |
| 2.202 | 8.790 | 9380. | .9714 | .9921 | .9753 | 29.94 | .2185 | .001250 |
| 2.239 | 8.937 | 9537. | .9751 | .9931 | .9785 | 30.04 | .2003 | .001274 |
| 2.280 | 9.105 | 9715. | .9784 | .9940 | .9813 | 30.13 | .1807 | .001300 |
| 2.308 | 9.216 | 9834. | .9806 | .9946 | .9832 | 30.20 | .1677 | .001317 |
| 2.345 | 9.363 | 9991. | .9818 | .9949 | .9843 | 30.23 | .1508 | .001339 |
| 2.382 | 9.510 | 10148. | .9845 | .9956 | .9866 | 30.31 | .1344 | .001360 |
| 2.418 | 9.652 | 10299. | .9863 | .9961 | .9882 | 30.35 | .1190 | .001380 |
| 2.468 | 9.855 | 10516. | .9879 | .9966 | .9896 | 30.40 | .0976 | .001408 |
| 2.515 | 10.042 | 10716. | .9899 | .9971 | .9913 | 30.46 | .0790 | .001432 |
| 2.555 | 10.200 | 10884. | .9922 | .9978 | .9933 | 30.52 | .0640 | .001451 |
| 2.603 | 10.392 | 11089. | .9927 | .9979 | .9937 | 30.53 | .0466 | .001473 |
| 2.644 | 10.595 | 11305. | .9946 | .9984 | .9953 | 30.59 | .0295 | .001495 |
| 2.692 | 10.747 | 11468. | .9962 | .9989 | .9967 | 30.63 | .0175 | .001510 |
| 2.734 | 10.914 | 11646. | .9954 | .9987 | .9960 | 30.61 | .0051 | .001526 |
| 2.768 | 11.051 | 11792. | .9970 | .9991 | .9974 | 30.65 | 0.0000 | .001533 |
| 2.804 | 11.193 | 11944. | .9970 | .9991 | .9974 | 30.65 | 0.0000 | .001533 |
| 2.895 | 11.558 | 12333. | .9988 | .9996 | .9990 | 30.70 | 0.0000 | .001533 |
| 2.987 | 11.923 | 12723. | .9991 | .9997 | .9992 | 30.71 | 0.0000 | .001533 |
| 3.070 | 12.258 | 13080. | .9991 | .9997 | .9992 | 30.71 | 0.0000 | .001533 |
| 3.154 | 12.593 | 13437. | .9999 | .9999 | .9999 | 30.73 | 0.0000 | .001533 |
| 3.235 | 12.917 | 13783. | .9993 | .9998 | .9994 | 30.72 | 0.0000 | .001533 |
| 3.329 | 13.292 | 14183. | .9997 | .9999 | .9998 | 30.73 | 0.0000 | .001533 |
| 3.406 | 13.596 | 14508. | 1.0001 | 1.0000 | 1.0001 | 30.74 | 0.0000 | .001533 |
| 3.486 | 13.916 | 14849. | 1.0003 | 1.0000 | 1.0002 | 30.74 | 0.0000 | .001533 |
| 3.561 | 14.215 | 15168. | .9996 | .9999 | .9997 | 30.73 | 0.0000 | .001533 |
| 3.632 | 14.499 | 15471. | 1.0001 | 1.0000 | 1.0001 | 30.74 | 0.0000 | .001533 |
| 3.698 | 14.762 | 15752. | 1.0000 | 1.0000 | 1.0000 | 30.74 | 0.0000 | .001533 |

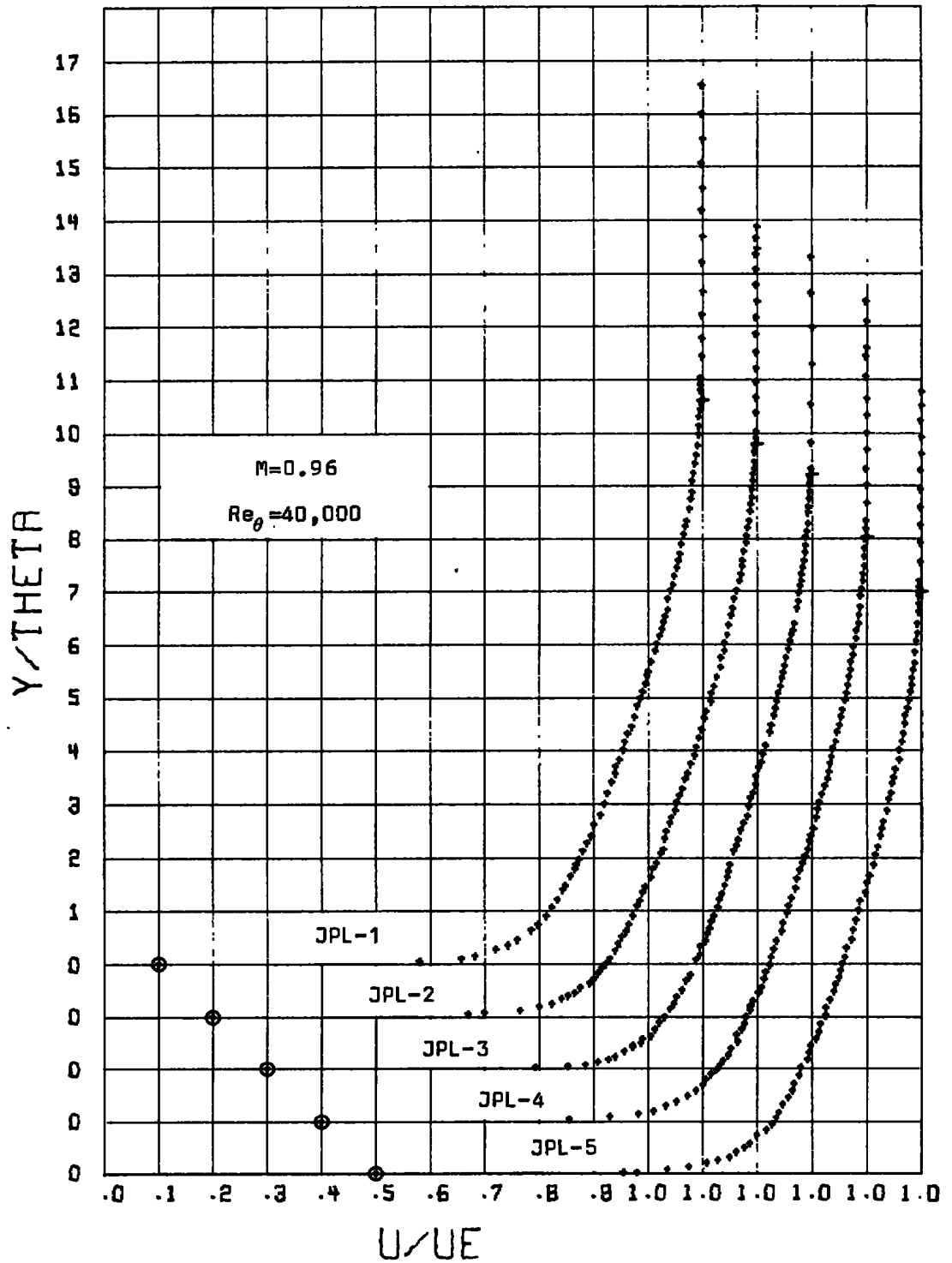


Figure A25. Mean Velocity Profiles.

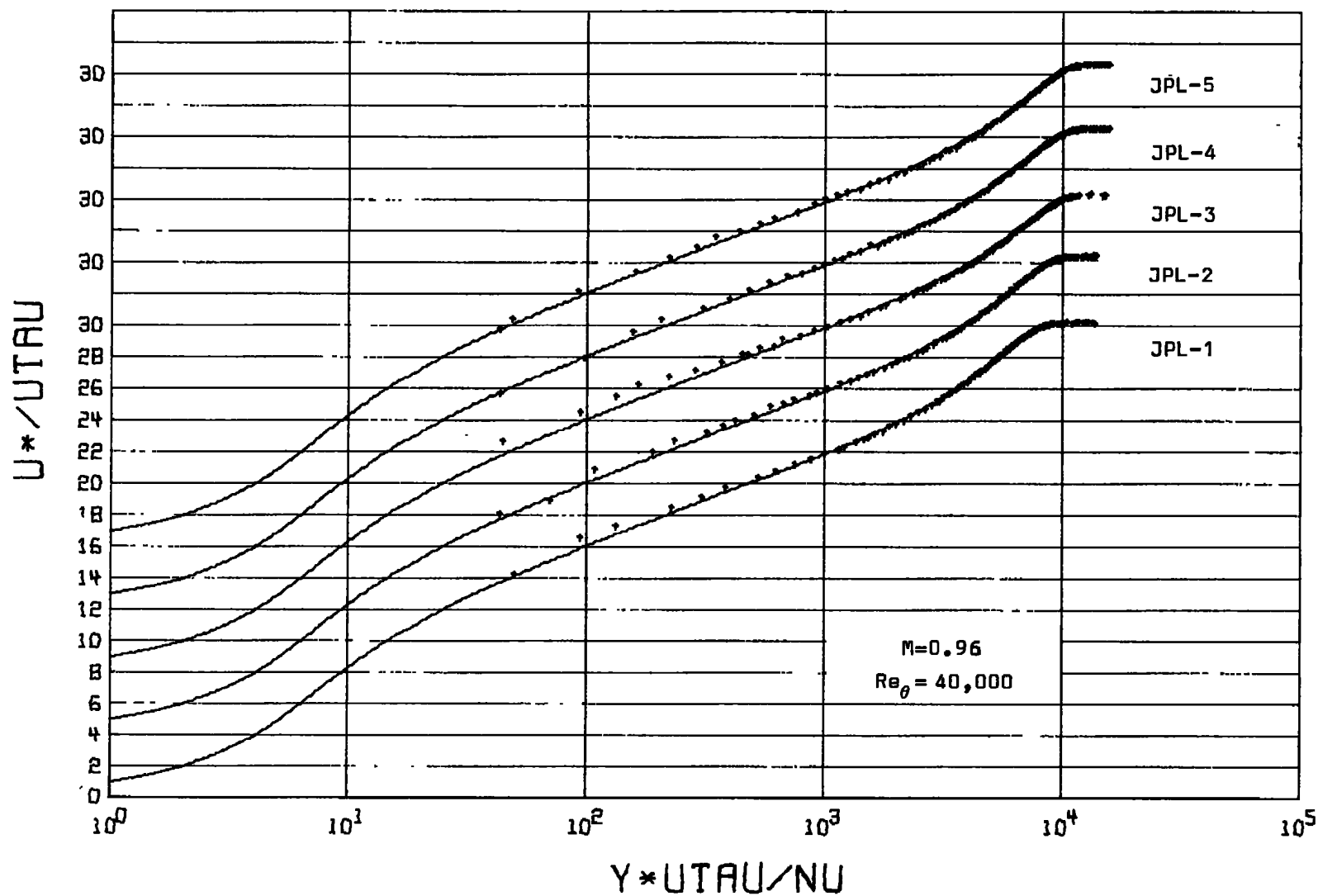


Figure A26. Van Driest Scaled Mean Velocity Profiles.

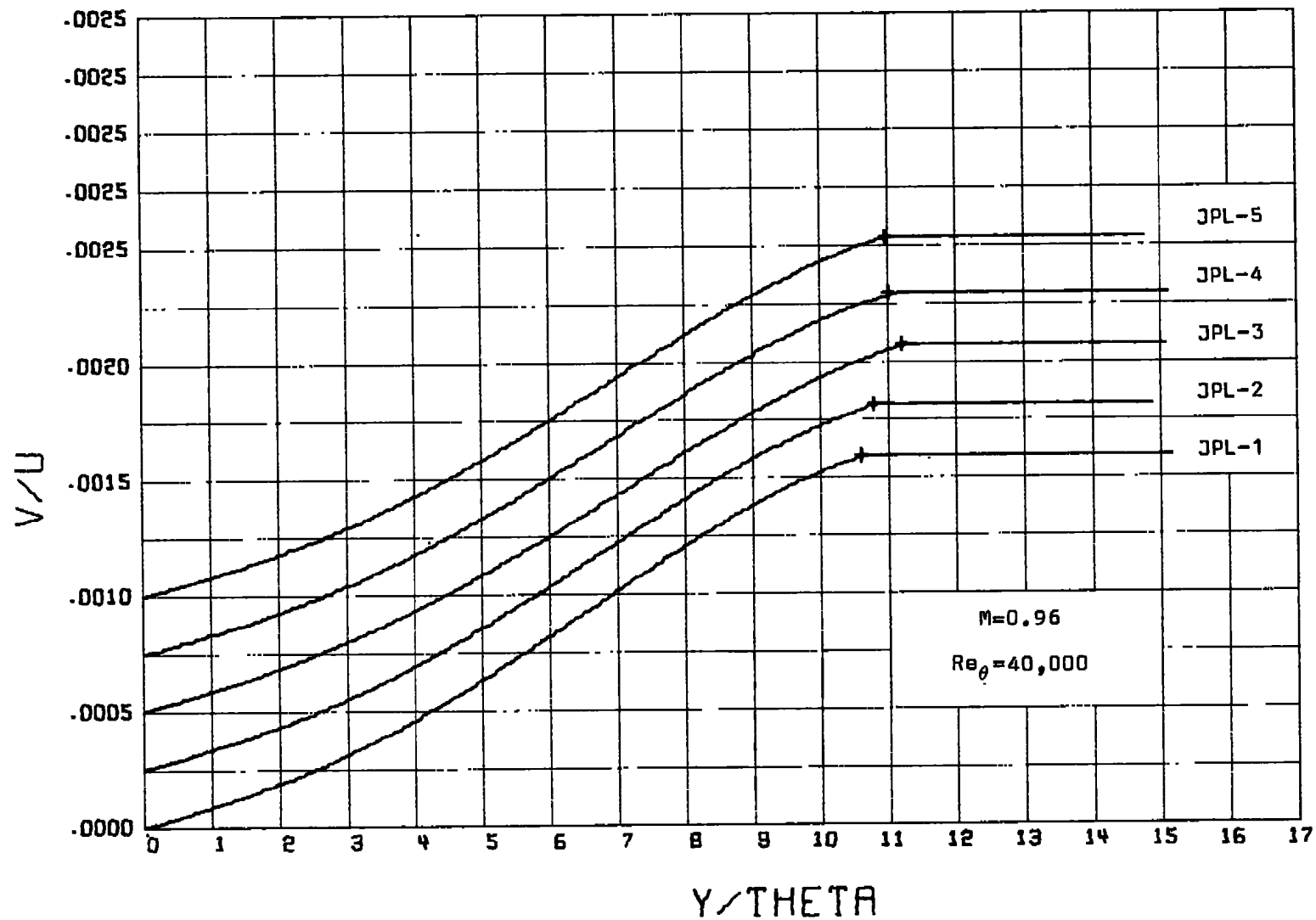


Figure A27. Normal Velocity Distribution.

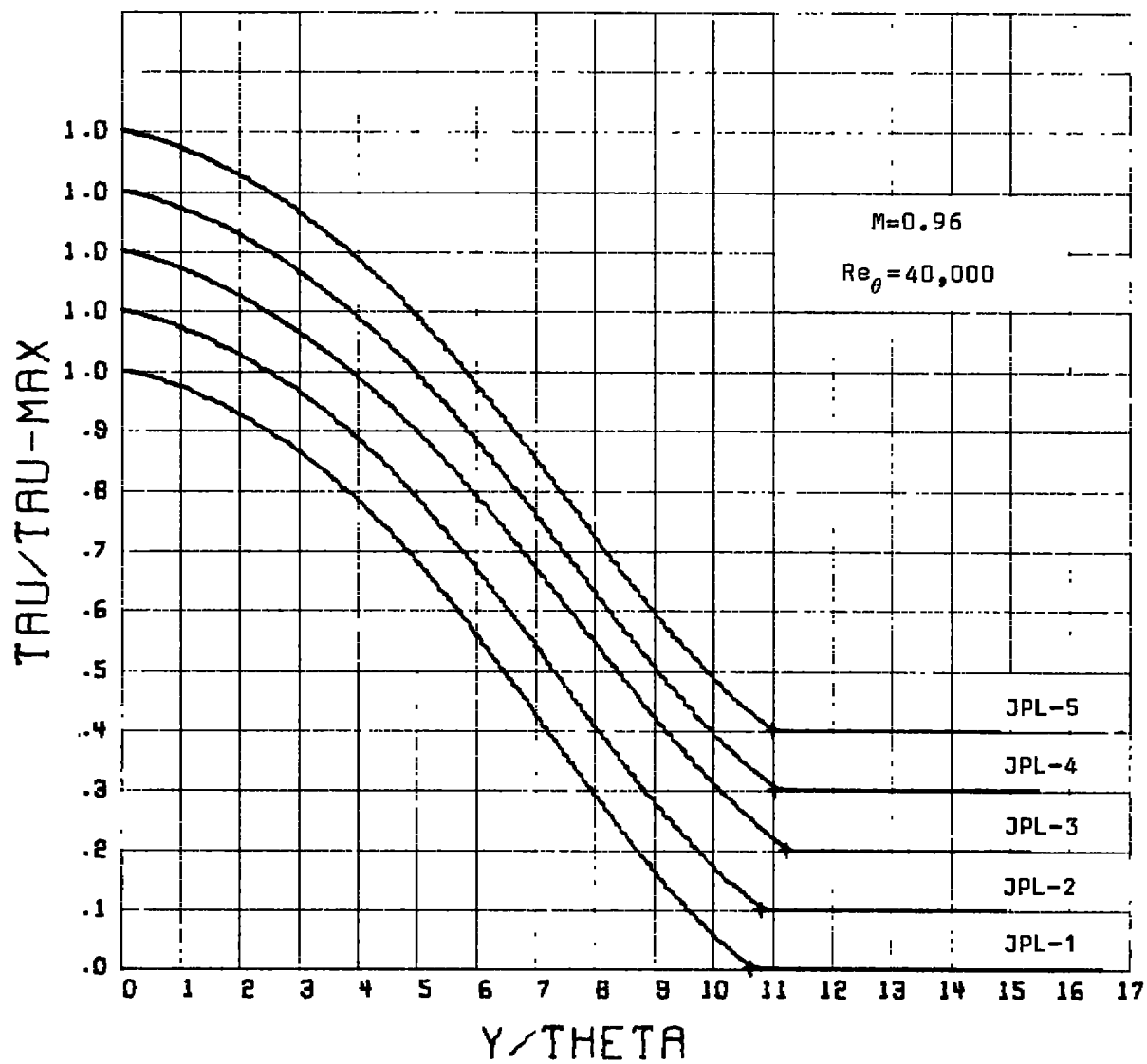


Figure A28. Shear Stress Distribution.

TABLE A11. DATA SUMMARY
 PROFILE - JPL-2 - - PITOT PRESSURE DATA

EDGE MACH NO.= 1.3141
 X=-26.21 CM

TOTAL PRESSURE= .6691E+05 N/M**2
 TOTAL TEMPERATURE= 312.53 DEG-K

UE= 401.96 M/SEC
 RE-DELTA-STAR= 39050.

DELTA STAR= .4186 CM
 RE-THETA= 19780.

THETA= .2121 CM
 NUWALL= .6931 CM**2/SEC

M= 1.973

LEAST SQUARE FIT PARAMETERS

UTAU= 14.5261 M/SEC
 CHISQR= .7536F-05

CF= .002000
 YMAX= 2.200 CM

PI= .6503
 YMIN= .066 CM

DELTA= 2.3258 CM

| Y (CM) | Y/THETA | Y-PLUS | M/ME | RHO/RHME | U/UE | U-PLUS | TAU/TAU-MAX | V/U |
|--------|---------|--------|--------|----------|--------|--------|-------------|----------|
| 0.000 | 0.000 | 0. | 0.0000 | .7658 | 0.0000 | 0.00 | 1.0000 | 0.000000 |
| .010 | .047 | 21. | .3998 | .8033 | .4460 | 12.44 | 1.0000 | 0.000000 |
| .017 | .083 | 37. | .4543 | .8142 | .5035 | 14.07 | .9994 | .000003 |
| .034 | .161 | 71. | .5052 | .8256 | .5560 | 15.57 | .9980 | .000011 |
| .043 | .203 | 90. | .5363 | .8332 | .5875 | 16.48 | .9971 | .000015 |
| .066 | .311 | 138. | .5679 | .8414 | .6192 | 17.40 | .9947 | .000025 |
| .100 | .473 | 210. | .5932 | .8482 | .6440 | 18.12 | .9904 | .000040 |
| .119 | .562 | 250. | .6096 | .8529 | .6601 | 18.59 | .9879 | .000049 |
| .148 | .700 | 311. | .6312 | .8591 | .6810 | 19.20 | .9837 | .000063 |
| .171 | .808 | 359. | .6406 | .8619 | .6900 | 19.46 | .9802 | .000074 |
| .213 | 1.005 | 447. | .6571 | .8669 | .7057 | 19.92 | .9733 | .000094 |
| .245 | 1.155 | 513. | .6694 | .8708 | .7173 | 20.27 | .9678 | .000110 |
| .285 | 1.347 | 598. | .6840 | .8754 | .7311 | 20.67 | .9602 | .000131 |
| .323 | 1.526 | 678. | .6956 | .8791 | .7418 | 20.99 | .9527 | .000152 |
| .370 | 1.748 | 777. | .7071 | .8829 | .7525 | 21.31 | .9427 | .000178 |
| .406 | 1.916 | 851. | .7207 | .8875 | .7650 | 21.68 | .9346 | .000199 |
| .439 | 2.071 | 920. | .7232 | .8883 | .7673 | 21.75 | .9268 | .000218 |
| .486 | 2.293 | 1019. | .7343 | .8921 | .7774 | 22.05 | .9149 | .000248 |
| .523 | 2.466 | 1096. | .7460 | .8961 | .7880 | 22.37 | .9050 | .000272 |
| .561 | 2.646 | 1176. | .7534 | .8987 | .7947 | 22.57 | .8942 | .000297 |
| .593 | 2.796 | 1243. | .7613 | .9015 | .8017 | 22.78 | .8848 | .000319 |
| .622 | 2.933 | 1304. | .7709 | .9050 | .8103 | 23.04 | .8758 | .000340 |
| .678 | 3.197 | 1421. | .7805 | .9085 | .8189 | 23.29 | .8675 | .000382 |
| .715 | 3.371 | 1498. | .7861 | .9105 | .8238 | 23.44 | .8648 | .000410 |
| .750 | 3.538 | 1573. | .7950 | .9138 | .8316 | 23.68 | .8619 | .000438 |
| .788 | 3.718 | 1652. | .8049 | .9175 | .8403 | 23.94 | .8675 | .000470 |
| .828 | 3.904 | 1735. | .8094 | .9192 | .8442 | 24.06 | .8619 | .000503 |
| .871 | 4.107 | 1825. | .8176 | .9224 | .8513 | 24.28 | .8641 | .000541 |
| .901 | 4.251 | 1889. | .8231 | .9245 | .8561 | 24.42 | .8710 | .000569 |
| .941 | 4.436 | 1972. | .8316 | .9278 | .8633 | 24.64 | .8753 | .000605 |
| .980 | 4.622 | 2054. | .8389 | .9306 | .8696 | 24.83 | .8750 | .000643 |
| 1.018 | 4.802 | 2134. | .8473 | .9339 | .8768 | 25.05 | .8710 | .000679 |
| 1.059 | 4.993 | 2219. | .8510 | .9354 | .8799 | 25.15 | .8699 | .000719 |
| 1.099 | 5.137 | 2283. | .8563 | .9375 | .8844 | 25.28 | .8614 | .000750 |
| 1.171 | 5.287 | 2350. | .8620 | .9398 | .8892 | 25.43 | .8646 | .000783 |
| 1.158 | 5.460 | 2427. | .8678 | .9422 | .8941 | 25.58 | .8651 | .000821 |
| 1.200 | 5.658 | 2515. | .8752 | .9452 | .9002 | 25.77 | .8621 | .000865 |
| 1.229 | 5.794 | 2576. | .8816 | .9478 | .9055 | 25.93 | .8657 | .000897 |
| 1.259 | 5.939 | 2640. | .8853 | .9494 | .9086 | 26.03 | .8683 | .000930 |
| 1.292 | 6.107 | 2714. | .8910 | .9517 | .9133 | 26.17 | .8677 | .000968 |
| 1.325 | 6.251 | 2778. | .8959 | .9538 | .9173 | 26.30 | .8697 | .001002 |

| TABLE A11. (CONT.) | | | | | | | | |
|--------------------|---------|--------|--------|----------|--------|--------|-------------|---------|
| Y (CM) | Y/THETA | Y-PLUS | M/ME | RHO/RHOF | U/UE | U-PLUS | TAU/TAU-MAX | V/U |
| 1.363 | 6.430 | 2858. | .9000 | .9555 | .9267 | 26.40 | .5269 | .001044 |
| 1.404 | 6.677 | 2943. | .9068 | .9584 | .9263 | 26.58 | .5022 | .001090 |
| 1.447 | 6.826 | 3034. | .9135 | .9612 | .9318 | 26.74 | .4757 | .001138 |
| 1.493 | 7.041 | 3130. | .9187 | .9632 | .9355 | 26.86 | .4472 | .001189 |
| 1.576 | 7.197 | 3190. | .9256 | .9664 | .9415 | 27.05 | .4265 | .001226 |
| 1.562 | 7.364 | 3273. | .9297 | .9682 | .9448 | 27.15 | .4042 | .001266 |
| 1.600 | 7.544 | 3353. | .9344 | .9703 | .9486 | 27.27 | .3801 | .001308 |
| 1.637 | 7.718 | 3430. | .9381 | .9719 | .9515 | 27.36 | .3569 | .001349 |
| 1.668 | 7.867 | 3497. | .9435 | .9743 | .9558 | 27.49 | .3369 | .001384 |
| 1.709 | 8.059 | 3582. | .9496 | .9770 | .9607 | 27.65 | .3114 | .001428 |
| 1.752 | 8.263 | 3673. | .9539 | .9789 | .9641 | 27.75 | .2845 | .001474 |
| 1.793 | 8.454 | 3758. | .9578 | .9807 | .9672 | 27.85 | .2597 | .001516 |
| 1.833 | 8.645 | 3843. | .9643 | .9836 | .9723 | 28.01 | .2351 | .001558 |
| 1.879 | 8.861 | 3939. | .9677 | .9851 | .9750 | 28.09 | .2075 | .001605 |
| 1.922 | 9.065 | 4029. | .9706 | .9864 | .9772 | 28.16 | .1830 | .001646 |
| 1.973 | 9.304 | 4136. | .9756 | .9887 | .9811 | 28.29 | .1545 | .001693 |
| 2.010 | 9.478 | 4213. | .9794 | .9904 | .9841 | 28.38 | .1346 | .001726 |
| 2.047 | 9.652 | 4290. | .9840 | .9926 | .9877 | 28.49 | .1154 | .001758 |
| 2.098 | 9.891 | 4397. | .9852 | .9931 | .9886 | 28.52 | .0900 | .001799 |
| 2.131 | 10.047 | 4466. | .9884 | .9946 | .9910 | 28.60 | .0744 | .001825 |
| 2.169 | 10.227 | 4546. | .9896 | .9951 | .9920 | 28.63 | .0571 | .001853 |
| 2.200 | 10.376 | 4612. | .9916 | .9961 | .9936 | 28.68 | .0436 | .001875 |
| 2.240 | 10.562 | 4695. | .9928 | .9966 | .9944 | 28.70 | .0277 | .001901 |
| 2.261 | 10.644 | 4740. | .9930 | .9967 | .9946 | 28.71 | .0195 | .001914 |
| 2.302 | 10.855 | 4825. | .9938 | .9971 | .9952 | 28.73 | .0051 | .001938 |
| 2.334 | 11.005 | 4892. | .9962 | .9982 | .9971 | 28.79 | 0.0000 | .001946 |
| 2.364 | 11.149 | 4956. | .9969 | .9985 | .9976 | 28.81 | 0.0000 | .001946 |
| 2.433 | 11.472 | 5099. | .9988 | .9994 | .9991 | 28.85 | 0.0000 | .001946 |
| 2.513 | 11.949 | 5267. | .9997 | .9998 | .9998 | 28.87 | 0.0000 | .001946 |
| 2.595 | 12.238 | 5440. | .9998 | .9994 | .9991 | 28.85 | 0.0000 | .001946 |
| 2.672 | 12.598 | 5600. | .9987 | .9993 | .9990 | 28.85 | 0.0000 | .001946 |
| 2.759 | 13.011 | 5783. | .9996 | .9998 | .9997 | 28.87 | 0.0000 | .001946 |
| 2.854 | 13.460 | 5983. | 1.0005 | 1.0002 | 1.0004 | 28.89 | 0.0000 | .001946 |
| 2.936 | 13.843 | 6153. | .9996 | .9998 | .9997 | 28.87 | 0.0000 | .001946 |
| 3.017 | 14.226 | 6324. | 1.0007 | 1.0003 | 1.0005 | 28.90 | 0.0000 | .001946 |
| 3.103 | 14.634 | 6505. | .9997 | .9999 | .9998 | 28.87 | 0.0000 | .001946 |
| 3.193 | 15.011 | 6672. | 1.0007 | 1.0003 | 1.0005 | 28.90 | 0.0000 | .001946 |
| 3.249 | 15.322 | 6811. | .9994 | .9997 | .9995 | 28.97 | 0.0000 | .001946 |
| 3.331 | 15.705 | 6981. | .9992 | .9996 | .9994 | 28.86 | 0.0000 | .001946 |
| 3.415 | 16.101 | 7157. | 1.0001 | 1.0000 | 1.0001 | 28.88 | 0.0000 | .001946 |
| 3.503 | 16.520 | 7343. | 1.0001 | 1.0000 | 1.0001 | 28.88 | 0.0000 | .001946 |

TABLE A11. (CONT.)
PROFILE - JPL-3 - - - PITOT PRESSURE DATA

EDGE MACH NO.= 1.3215 TOTAL PRESSURE= .6651E+05 N/M**2
X= -7.62 CM TOTAL TEMPERATURE= 310.59 DEG-K

UE= 402.38 M/SEC. DELTA STAR= .4474 CM THETA= .2262' CM H= 1.978
RE-DELTA-STAR= 43290. RE-THETA= 21880. NUWALL= .6952 CM**2/SEC.

LEAST SQUARE FIT PARAMETERS
UTAU= 14.4985 M/SFC CF= .001983 PI= .6356 DELTA= 2.5047 CM
CHISQR= .5243E-05 YMAX= 2.358 CM YMIN= .095 CM

| Y (CM) | Y/THETA | Y-PLUS | M/ME | RHO/RHOF | U/UE | U-PLUS | TAU/TAU-MAX | V/U |
|--------|---------|--------|--------|----------|--------|--------|-------------|----------|
| 0.000 | 0.000 | 0. | 0.0000 | .7638 | 0.0000 | 0.00 | 1.0000 | 0.000000 |
| .010 | .044 | 21. | .4047 | .8025 | .4518 | 12.64 | 1.0000 | 0.000000 |
| .031 | .140 | 66. | .5071 | .8245 | .5584 | 15.69 | .9985 | .000009 |
| .053 | .235 | 111. | .5388 | .8324 | .5905 | 16.62 | .9965 | .000017 |
| .066 | .291 | 137. | .5610 | .8387 | .6128 | 17.26 | .9952 | .000023 |
| .077 | .123 | 58. | .4458 | .8108 | .4950 | 13.87 | .9947 | .000025 |
| .076 | .336 | 158. | .5759 | .8421 | .6275 | 17.69 | .9941 | .000027 |
| .095 | .421 | 198. | .5914 | .8464 | .6428 | 18.14 | .9919 | .000035 |
| .113 | .499 | 235. | .6060 | .8506 | .6571 | 18.56 | .9897 | .000042 |
| .134 | .595 | 280. | .6180 | .8540 | .6687 | 18.90 | .9870 | .000052 |
| .161 | .713 | 336. | .6332 | .8585 | .6833 | 19.33 | .9833 | .000063 |
| .184 | .814 | 384. | .6385 | .8607 | .6884 | 19.48 | .9801 | .000073 |
| .200 | .887 | 418. | .6521 | .8643 | .7014 | 19.86 | .9776 | .000081 |
| .229 | 1.016 | 479. | .6621 | .8674 | .7110 | 20.14 | .9731 | .000094 |
| .275 | 1.218 | 574. | .6795 | .8729 | .7273 | 20.63 | .9656 | .000115 |
| .317 | 1.381 | 651. | .6912 | .8767 | .7382 | 20.95 | .9591 | .000133 |
| .340 | 1.504 | 709. | .6968 | .8785 | .7434 | 21.11 | .9539 | .000147 |
| .373 | 1.650 | 778. | .7083 | .8823 | .7540 | 21.42 | .9476 | .000163 |
| .415 | 1.835 | 866. | .7195 | .8861 | .7644 | 21.73 | .9391 | .000185 |
| .443 | 1.959 | 924. | .7215 | .8868 | .7662 | 21.79 | .9331 | .000200 |
| .480 | 2.122 | 1001. | .7315 | .8902 | .7753 | 22.06 | .9249 | .000220 |
| .519 | 2.290 | 1080. | .7397 | .8931 | .7828 | 22.28 | .9160 | .000242 |
| .549 | 2.430 | 1145. | .7470 | .8956 | .7893 | 22.48 | .9082 | .000261 |
| .591 | 2.616 | 1234. | .7580 | .8995 | .7992 | 22.78 | .8974 | .000286 |
| .631 | 2.790 | 1316. | .7636 | .9015 | .8042 | 22.93 | .8867 | .000311 |
| .669 | 2.958 | 1395. | .7707 | .9041 | .8105 | 23.12 | .8759 | .000336 |
| .698 | 3.087 | 1456. | .7753 | .9058 | .8146 | 23.24 | .8672 | .000355 |
| .726 | 3.211 | 1515. | .7793 | .9073 | .8182 | 23.35 | .8587 | .000375 |
| .763 | 3.374 | 1591. | .7885 | .9106 | .8263 | 23.59 | .8470 | .000400 |
| .803 | 3.553 | 1676. | .7940 | .9127 | .8310 | 23.74 | .8335 | .000430 |
| .835 | 3.694 | 1742. | .8029 | .9161 | .8388 | 23.98 | .8225 | .000454 |
| .872 | 3.856 | 1819. | .8052 | .9169 | .8408 | 24.04 | .8093 | .000482 |
| .908 | 4.014 | 1893. | .8132 | .9200 | .8478 | 24.25 | .7961 | .000510 |
| .958 | 4.238 | 1999. | .8212 | .9231 | .8548 | 24.46 | .7764 | .000551 |
| .998 | 4.412 | 2081. | .8288 | .9260 | .8612 | 24.66 | .7605 | .000584 |
| 1.031 | 4.558 | 2150. | .8330 | .9277 | .8649 | 24.77 | .7467 | .000612 |
| 1.076 | 4.760 | 2246. | .8430 | .9316 | .8734 | 25.03 | .7269 | .000652 |
| 1.113 | 4.923 | 2322. | .8488 | .9340 | .8783 | 25.18 | .7105 | .000685 |
| 1.150 | 5.086 | 2399. | .8544 | .9367 | .8830 | 25.32 | .6935 | .000718 |
| 1.192 | 5.271 | 2487. | .8617 | .9392 | .8891 | 25.51 | .6737 | .000757 |
| 1.238 | 5.473 | 2582. | .8683 | .9419 | .8946 | 25.68 | .6514 | .000800 |

| Y (CM) | Y/THETA | Y-PLUS | TABLE A11. (CONT.) M/ME | RHO/RHOF | U/UE | U-PLUS | TAU/TAU-MAX | V/U |
|--------|---------|--------|----------------------------|----------|--------|--------|-------------|---------|
| 1.282 | 5.670 | 2675. | .8746 | .9445 | .8999 | 25.85 | .6292 | .000843 |
| 1.336 | 5.906 | 2786. | .8839 | .9483 | .9076 | 26.08 | .6017 | .000895 |
| 1.371 | 6.063 | 2860. | .8870 | .9496 | .9102 | 26.16 | .5830 | .000930 |
| 1.407 | 6.220 | 2934. | .8939 | .9525 | .9159 | 26.34 | .5639 | .000966 |
| 1.449 | 6.405 | 3022. | .9004 | .9553 | .9212 | 26.50 | .5411 | .001008 |
| 1.497 | 6.619 | 3122. | .9046 | .9571 | .9247 | 26.61 | .5143 | .001057 |
| 1.541 | 6.815 | 3215. | .9128 | .9606 | .9314 | 26.82 | .4894 | .001102 |
| 1.579 | 6.984 | 3294. | .9179 | .9628 | .9354 | 26.95 | .4677 | .001141 |
| 1.612 | 7.130 | 3363. | .9222 | .9647 | .9389 | 27.06 | .4486 | .001175 |
| 1.648 | 7.287 | 3437. | .9272 | .9668 | .9429 | 27.18 | .4284 | .001211 |
| 1.697 | 7.506 | 3541. | .9312 | .9686 | .9462 | 27.28 | .3998 | .001262 |
| 1.724 | 7.624 | 3596. | .9349 | .9707 | .9491 | 27.37 | .3844 | .001289 |
| 1.742 | 7.702 | 3633. | .9393 | .9722 | .9526 | 27.48 | .3741 | .001307 |
| 1.775 | 7.848 | 3702. | .9411 | .9730 | .9541 | 27.53 | .3550 | .001340 |
| 1.812 | 8.011 | 3779. | .9461 | .9757 | .9581 | 27.65 | .3333 | .001377 |
| 1.838 | 8.179 | 3835. | .9498 | .9769 | .9609 | 27.74 | .3185 | .001403 |
| 1.874 | 8.286 | 3909. | .9521 | .9779 | .9628 | 27.80 | .2982 | .001437 |
| 1.902 | 8.410 | 3967. | .9560 | .9797 | .9659 | 27.90 | .2823 | .001464 |
| 1.940 | 8.578 | 4047. | .9600 | .9815 | .9690 | 28.00 | .2610 | .001501 |
| 1.971 | 8.713 | 4110. | .9644 | .9834 | .9724 | 28.11 | .2440 | .001529 |
| 2.014 | 8.904 | 4200. | .9673 | .9848 | .9747 | 28.18 | .2205 | .001569 |
| 2.052 | 9.072 | 4280. | .9687 | .9854 | .9758 | 28.21 | .2001 | .001603 |
| 2.094 | 9.257 | 4367. | .9750 | .9883 | .9807 | 28.37 | .1782 | .001639 |
| 2.128 | 9.409 | 4439. | .9765 | .9890 | .9819 | 28.40 | .1607 | .001668 |
| 2.166 | 9.577 | 4518. | .9798 | .9906 | .9845 | 28.49 | .1418 | .001699 |
| 2.207 | 9.757 | 4603. | .9825 | .9918 | .9865 | 28.55 | .1223 | .001731 |
| 2.244 | 9.920 | 4680. | .9853 | .9931 | .9887 | 28.62 | .1050 | .001760 |
| 2.268 | 10.077 | 4730. | .9876 | .9942 | .9905 | 28.68 | .0945 | .001777 |
| 2.321 | 10.262 | 4841. | .9899 | .9952 | .9923 | 28.73 | .0717 | .001814 |
| 2.358 | 10.425 | 4918. | .9910 | .9958 | .9931 | 28.76 | .0569 | .001838 |
| 2.387 | 10.554 | 4979. | .9914 | .9959 | .9934 | 28.77 | .0453 | .001856 |
| 2.425 | 10.723 | 5058. | .9929 | .9967 | .9946 | 28.81 | .0320 | .001878 |
| 2.470 | 10.919 | 5151. | .9944 | .9974 | .9957 | 28.84 | .0171 | .001902 |
| 2.504 | 11.071 | 5223. | .9961 | .9981 | .9970 | 28.88 | .0065 | .001919 |
| 2.540 | 11.228 | 5297. | .9959 | .9981 | .9969 | 28.88 | 0.0000 | .001930 |
| 2.593 | 11.464 | 5408. | .9980 | .9990 | .9984 | 28.93 | 0.0000 | .001930 |
| 2.665 | 11.784 | 5559. | .9996 | .9998 | .9997 | 28.97 | 0.0000 | .001930 |
| 2.750 | 12.160 | 5736. | .9998 | .9999 | .9998 | 28.97 | 0.0000 | .001930 |
| 2.832 | 12.519 | 5906. | 1.0008 | 1.0003 | 1.0006 | 29.00 | 0.0000 | .001930 |
| 2.921 | 12.912 | 6091. | 1.0000 | 1.0000 | 1.0000 | 28.98 | 0.0000 | .001930 |
| 3.012 | 13.317 | 6282. | 1.0004 | 1.0002 | 1.0003 | 28.99 | 0.0000 | .001930 |
| 3.105 | 13.726 | 6475. | 1.0004 | 1.0002 | 1.0003 | 28.99 | 0.0000 | .001930 |
| 3.191 | 14.063 | 6634. | 1.0002 | 1.0001 | 1.0001 | 28.98 | 0.0000 | .001930 |
| 3.260 | 14.411 | 6798. | .9994 | .9997 | .9995 | 28.96 | 0.0000 | .001930 |
| 3.356 | 14.838 | 7000. | 1.0005 | 1.0002 | 1.0004 | 28.99 | 0.0000 | .001930 |
| 3.431 | 15.169 | 7156. | 1.0000 | 1.0000 | 1.0000 | 28.98 | 0.0000 | .001930 |
| 3.524 | 15.579 | 7349. | 1.0011 | 1.0005 | 1.0008 | 29.00 | 0.0000 | .001930 |
| 3.604 | 15.933 | 7516. | .9998 | .9999 | .9998 | 28.97 | 0.0000 | .001930 |

TABLE A11. (CONT.)
PROFILE - JPL-4 -- - PITOT PRESSURE DATA

EDGE MACH NO.= 1.3197 TOTAL PRESSURE= .6665E+05 N/M**2
X= 0.00 CM TOTAL TEMPERATURE= 310.59 DEG-K

UE= 401.99 M/SEC DELTA STAR= .4601 CM THETA= .2335 CM H= 1.970
RE-DELTA-STAR= 43170. RE-THETA= 21900. NUWALL= .6862 CM**2/SEC CF= .001867

LEAST SQUARE FIT PARAMETERS
UTAU= 14.4789 M/SEC CF= .001983 PI= .6090 DELTA= 2.6199 CM
CHISQR= .1029E-04 YMAX= 2.470 CM YMIN= .082 CM

| Y (CM) | Y/THETA | Y-PLUS | M/ME | RHO/RHOE | U/UE | U-PLUS | TAU/TAU-MAX | V/U |
|--------|---------|--------|--------|----------|--------|--------|-------------|----------|
| 0.000 | 0.000 | 0. | 0.0000 | .7643 | 0.0000 | 0.00 | 1.0000 | 0.000000 |
| .010 | .043 | 21. | .4022 | .8024 | .4490 | 12.56 | 1.0000 | 0.000000 |
| .017 | .076 | 37. | .4190 | .8057 | .4668 | 13.07 | .9995 | .000003 |
| .035 | .152 | 75. | .5119 | .8261 | .5632 | 15.84 | .9981 | .000010 |
| .043 | .184 | 91. | .5362 | .8321 | .5878 | 16.55 | .9974 | .000013 |
| .060 | .261 | 128. | .5487 | .8353 | .6003 | 16.91 | .9957 | .000020 |
| .067 | .288 | 142. | .5685 | .8405 | .6201 | 17.48 | .9951 | .000023 |
| .082 | .353 | 174. | .5821 | .8442 | .6336 | 17.88 | .9935 | .000029 |
| .096 | .413 | 203. | .5936 | .8474 | .6449 | 18.21 | .9919 | .000034 |
| .111 | .478 | 235. | .6057 | .8508 | .6567 | 18.55 | .9901 | .000041 |
| .139 | .598 | 294. | .6231 | .8558 | .6736 | 19.05 | .9866 | .000052 |
| .160 | .685 | 337. | .6369 | .8599 | .6868 | 19.44 | .9839 | .000061 |
| .180 | .772 | 380. | .6451 | .8624 | .6946 | 19.67 | .9811 | .000069 |
| .205 | .881 | 434. | .6556 | .8656 | .7047 | 19.96 | .9774 | .000080 |
| .224 | .962 | 474. | .6627 | .8678 | .7114 | 20.16 | .9746 | .000089 |
| .241 | 1.033 | 509. | .6707 | .8703 | .7189 | 20.39 | .9721 | .000096 |
| .274 | 1.174 | 578. | .6796 | .8732 | .7273 | 20.63 | .9668 | .000111 |
| .307 | 1.314 | 648. | .6893 | .8763 | .7363 | 20.90 | .9612 | .000126 |
| .328 | 1.408 | 694. | .6922 | .8772 | .7391 | 20.98 | .9575 | .000136 |
| .353 | 1.512 | 744. | .7038 | .8810 | .7498 | 21.30 | .9531 | .000148 |
| .374 | 1.653 | 814. | .7114 | .8836 | .7548 | 21.51 | .9469 | .000164 |
| .425 | 1.822 | 897. | .7224 | .8873 | .7669 | 21.81 | .9392 | .000183 |
| .453 | 1.941 | 956. | .7249 | .8881 | .7692 | 21.88 | .9334 | .000198 |
| .492 | 2.066 | 1018. | .7303 | .8900 | .7741 | 22.03 | .9272 | .000213 |
| .518 | 2.219 | 1093. | .7388 | .8929 | .7818 | 22.26 | .9193 | .000232 |
| .546 | 2.338 | 1152. | .7432 | .8945 | .7858 | 22.38 | .9129 | .000248 |
| .574 | 2.458 | 1211. | .7503 | .8970 | .7922 | 22.57 | .9062 | .000264 |
| .604 | 2.588 | 1275. | .7573 | .8995 | .7985 | 22.76 | .8987 | .000281 |
| .637 | 2.730 | 1345. | .7621 | .9017 | .8028 | 22.89 | .8901 | .000301 |
| .673 | 2.882 | 1420. | .7681 | .9033 | .8081 | 23.05 | .8807 | .000323 |
| .713 | 3.056 | 1506. | .7751 | .9059 | .8144 | 23.24 | .8693 | .000348 |
| .746 | 3.198 | 1575. | .7802 | .9078 | .8188 | 23.38 | .8596 | .000370 |
| .786 | 3.366 | 1658. | .7896 | .9112 | .8271 | 23.63 | .8478 | .000396 |
| .829 | 3.551 | 1749. | .7973 | .9141 | .8339 | 23.83 | .8341 | .000426 |
| .858 | 3.676 | 1811. | .8039 | .9166 | .8397 | 24.01 | .8245 | .000446 |
| .896 | 3.839 | 1891. | .8074 | .9180 | .8427 | 24.10 | .8116 | .000474 |
| .932 | 3.992 | 1966. | .8109 | .9193 | .8458 | 24.19 | .7991 | .000500 |
| .965 | 4.133 | 2036. | .8183 | .9221 | .8521 | 24.39 | .7871 | .000526 |
| .999 | 4.280 | 2108. | .8237 | .9242 | .8568 | 24.53 | .7742 | .000552 |
| 1.038 | 4.449 | 2192. | .8312 | .9271 | .8632 | 24.73 | .7590 | .000583 |
| 1.084 | 4.644 | 2288. | .8378 | .9297 | .8689 | 24.90 | .7406 | .000621 |

| Y (CM) | Y/THETA | Y-PLUS | TABLE A11. (CONT.) M/ME | RHO/RHOE | U/UE | U-PLUS | TAU/TAU-MAX | V/U |
|--------|---------|--------|----------------------------|----------|--------|--------|-------------|---------|
| 1.113 | 4.769 | 2350. | .8428 | .9317 | .8731 | 25.03 | .7286 | .000645 |
| 1.153 | 4.938 | 2433. | .8460 | .9330 | .8759 | 25.11 | .7119 | .000678 |
| 1.192 | 5.107 | 2516. | .8530 | .9358 | .8818 | 25.30 | .6947 | .000712 |
| 1.219 | 5.221 | 2572. | .8588 | .9381 | .8866 | 25.44 | .6877 | .000735 |
| 1.247 | 5.341 | 2631. | .8633 | .9399 | .8904 | 25.56 | .6700 | .000760 |
| 1.290 | 5.525 | 2722. | .8685 | .9421 | .8948 | 25.70 | .6499 | .000799 |
| 1.333 | 5.710 | 2813. | .8745 | .9446 | .8998 | 25.85 | .6291 | .000839 |
| 1.358 | 5.819 | 2867. | .8779 | .9459 | .9026 | 25.94 | .6170 | .000862 |
| 1.394 | 5.971 | 2942. | .8841 | .9485 | .9077 | 26.10 | .5994 | .000895 |
| 1.436 | 6.151 | 3030. | .8876 | .9500 | .9106 | 26.18 | .5783 | .000934 |
| 1.473 | 6.309 | 3108. | .8945 | .9529 | .9163 | 26.36 | .5594 | .000969 |
| 1.506 | 6.450 | 3178. | .8988 | .9547 | .9199 | 26.47 | .5423 | .001001 |
| 1.549 | 6.635 | 3269. | .9056 | .9576 | .9255 | 26.64 | .5195 | .001043 |
| 1.602 | 6.863 | 3381. | .9107 | .9598 | .9296 | 26.77 | .4910 | .001094 |
| 1.631 | 6.989 | 3443. | .9166 | .9623 | .9344 | 26.92 | .4752 | .001123 |
| 1.714 | 7.342 | 3617. | .9287 | .9676 | .9441 | 27.23 | .4299 | .001203 |
| 1.671 | 7.157 | 3526. | .9204 | .9640 | .9374 | 27.02 | .4268 | .001209 |
| 1.751 | 7.500 | 3695. | .9300 | .9681 | .9451 | 27.26 | .4099 | .001238 |
| 1.795 | 7.690 | 3789. | .9346 | .9702 | .9489 | 27.37 | .3854 | .001281 |
| 1.841 | 7.884 | 3885. | .9405 | .9728 | .9536 | 27.52 | .3602 | .001325 |
| 1.875 | 8.033 | 3957. | .9454 | .9750 | .9575 | 27.64 | .3413 | .001358 |
| 1.921 | 8.229 | 4054. | .9498 | .9769 | .9609 | 27.75 | .3167 | .001401 |
| 1.962 | 8.403 | 4140. | .9563 | .9798 | .9661 | 27.91 | .2940 | .001439 |
| 2.002 | 8.577 | 4225. | .9590 | .9810 | .9692 | 27.98 | .2721 | .001476 |
| 2.039 | 8.734 | 4303. | .9642 | .9834 | .9723 | 28.11 | .2574 | .001509 |
| 2.082 | 8.919 | 4394. | .9661 | .9842 | .9737 | 28.15 | .2297 | .001547 |
| 2.119 | 9.077 | 4472. | .9708 | .9864 | .9775 | 28.27 | .2106 | .001579 |
| 2.153 | 9.224 | 4544. | .9717 | .9868 | .9782 | 28.29 | .1931 | .001608 |
| 2.194 | 9.398 | 4630. | .9763 | .9889 | .9817 | 28.41 | .1729 | .001642 |
| 2.240 | 9.594 | 4727. | .9807 | .9910 | .9851 | 28.51 | .1503 | .001679 |
| 2.275 | 9.746 | 4802. | .9826 | .9918 | .9866 | 28.56 | .1339 | .001706 |
| 2.315 | 9.915 | 4885. | .9853 | .9931 | .9887 | 28.63 | .1160 | .001736 |
| 2.357 | 10.094 | 4973. | .9860 | .9934 | .9892 | 28.64 | .0975 | .001766 |
| 2.392 | 10.247 | 5048. | .9894 | .9950 | .9919 | 28.73 | .0825 | .001790 |
| 2.426 | 10.393 | 5120. | .9918 | .9961 | .9937 | 28.79 | .0685 | .001813 |
| 2.470 | 10.578 | 5212. | .9921 | .9963 | .9939 | 28.79 | .0518 | .001840 |
| 2.508 | 10.741 | 5292. | .9940 | .9971 | .9954 | 28.84 | .0379 | .001862 |
| 2.534 | 10.856 | 5348. | .9964 | .9983 | .9972 | 28.90 | .0286 | .001877 |
| 2.575 | 11.030 | 5434. | .9959 | .9980 | .9968 | 28.88 | .0153 | .001899 |
| 2.607 | 11.166 | 5501. | .9962 | .9982 | .9971 | 28.89 | .0056 | .001914 |
| 2.641 | 11.313 | 5573. | .9975 | .9988 | .9981 | 28.93 | 0.0000 | .001923 |
| 2.667 | 11.421 | 5627. | .9972 | .9986 | .9978 | 28.92 | 0.0000 | .001923 |
| 2.743 | 11.748 | 5788. | .9994 | .9997 | .9995 | 28.97 | 0.0000 | .001923 |
| 2.795 | 11.971 | 5898. | .9999 | .9999 | .9999 | 28.98 | 0.0000 | .001923 |
| 2.875 | 12.313 | 6066. | 1.0001 | 1.0000 | 1.0001 | 28.99 | 0.0000 | .001923 |
| 2.954 | 12.651 | 6233. | 1.0001 | 1.0000 | 1.0001 | 28.99 | 0.0000 | .001923 |
| 3.054 | 13.080 | 6444. | 1.0005 | 1.0002 | 1.0004 | 29.00 | 0.0000 | .001923 |
| 3.150 | 13.494 | 6648. | 1.0005 | 1.0002 | 1.0004 | 29.00 | 0.0000 | .001923 |
| 3.263 | 13.978 | 6886. | 1.0003 | 1.0001 | 1.0002 | 28.99 | 0.0000 | .001923 |
| 3.364 | 14.407 | 7098. | 1.0007 | 1.0003 | 1.0005 | 29.00 | 0.0000 | .001923 |
| 3.484 | 14.924 | 7353. | .9998 | .9999 | .9998 | 28.98 | 0.0000 | .001923 |
| 3.561 | 15.250 | 7513. | .9999 | .9999 | .9999 | 28.98 | 0.0000 | .001923 |
| 3.686 | 15.789 | 7779. | 1.0001 | 1.0000 | 1.0001 | 28.99 | 0.0000 | .001923 |

TABLE A11. (CONT.)
PROFILE - JPL-5 - - - PITOT PRESSURE DATA

EDGE MACH NO.= 1.3151
X= 7.62 CM

TOTAL PRESSURE= .6678E+05 N/M**2
TOTAL TEMPERATURE= 304.28 DEG-K

UE= 395.85 M/SEC
RE-DELTA-STAR= 47510.

DELTA STAR= .4777 CM
RE-THETA= 24190.

THETA= .2433 CM
NUWALL= .6598 CM**2/SEC

H= 1.963

LEAST SQUARE FIT PARAMETERS
UTAU= 14.1976 M/SEC
CHISQR= .9077E-05

CF= .001959
YMAX= 2.571 CM

PI= .6205
YMIN= .092 CM

OFLTA= 2.7131 CM

| Y (CM) | Y/THETA | Y-PLUS | M/ME | RHO/RHOF | U/UE | U-PLUS | TAU/TAU-MAX | V/U |
|--------|---------|--------|--------|----------|--------|--------|-------------|----------|
| 0.000 | 0.000 | 0. | 0.0000 | .7656 | 0.0000 | 0.00 | 1.0000 | 0.000000 |
| .010 | .041 | 21. | .3966 | .8024 | .4428 | 12.47 | 1.0000 | 0.000000 |
| .022 | .093 | 49. | .4758 | .8186 | .5258 | 14.86 | .9992 | .000005 |
| .031 | .130 | 68. | .5081 | .8261 | .5591 | 15.82 | .9985 | .000008 |
| .050 | .208 | 109. | .5303 | .8315 | .5816 | 16.48 | .9969 | .000015 |
| .054 | .224 | 117. | .5473 | .8358 | .5987 | 16.97 | .9965 | .000017 |
| .072 | .297 | 155. | .5667 | .8409 | .6190 | 17.54 | .9948 | .000024 |
| .092 | .381 | 199. | .5865 | .8462 | .6376 | 18.11 | .9926 | .000031 |
| .120 | .495 | 259. | .6113 | .8537 | .6619 | 18.83 | .9894 | .000042 |
| .132 | .542 | 284. | .6208 | .8559 | .6711 | 19.10 | .9881 | .000047 |
| .153 | .631 | 330. | .6267 | .8576 | .6767 | 19.27 | .9854 | .000055 |
| .172 | .709 | 371. | .6369 | .8607 | .6865 | 19.56 | .9829 | .000063 |
| .186 | .767 | 401. | .6459 | .8634 | .6951 | 19.81 | .9810 | .000069 |
| .204 | .840 | 439. | .6517 | .8651 | .7007 | 19.98 | .9786 | .000076 |
| .236 | .970 | 508. | .6642 | .8690 | .7125 | 20.33 | .9740 | .000089 |
| .259 | 1.064 | 557. | .6725 | .8716 | .7203 | 20.56 | .9706 | .000099 |
| .293 | 1.205 | 631. | .6813 | .8744 | .7286 | 20.81 | .9652 | .000114 |
| .313 | 1.289 | 675. | .6870 | .8762 | .7339 | 20.97 | .9619 | .000123 |
| .339 | 1.393 | 729. | .6968 | .8794 | .7431 | 21.24 | .9576 | .000134 |
| .382 | 1.571 | 822. | .7058 | .8823 | .7514 | 21.49 | .9500 | .000154 |
| .421 | 1.732 | 907. | .7131 | .8848 | .7581 | 21.69 | .9426 | .000172 |
| .441 | 1.816 | 951. | .7176 | .8863 | .7623 | 21.82 | .9387 | .000187 |
| .490 | 2.014 | 1054. | .7330 | .8915 | .7763 | 22.24 | .9290 | .000206 |
| .534 | 2.213 | 1158. | .7391 | .8936 | .7818 | 22.41 | .9186 | .000231 |
| .594 | 2.401 | 1257. | .7467 | .8963 | .7887 | 22.62 | .9083 | .000255 |
| .632 | 2.599 | 1369. | .7552 | .8993 | .7964 | 22.85 | .8967 | .000282 |
| .679 | 2.792 | 1462. | .7642 | .9025 | .8044 | 23.09 | .8848 | .000309 |
| .707 | 2.907 | 1522. | .7708 | .9048 | .8103 | 23.27 | .8774 | .000326 |
| .742 | 3.053 | 1598. | .7789 | .9078 | .8175 | 23.49 | .8677 | .000347 |
| .791 | 3.251 | 1702. | .7821 | .9090 | .8203 | 23.58 | .8539 | .000378 |
| .822 | 3.382 | 1770. | .7879 | .9111 | .8254 | 23.73 | .8444 | .000398 |
| .858 | 3.528 | 1847. | .7964 | .9142 | .8329 | 23.96 | .8334 | .000422 |
| .894 | 3.674 | 1923. | .8023 | .9164 | .8380 | 24.17 | .8220 | .000446 |
| .935 | 3.846 | 2014. | .8096 | .9192 | .8444 | 24.31 | .8081 | .000475 |
| .971 | 3.993 | 2090. | .8153 | .9214 | .8494 | 24.46 | .7958 | .000501 |
| 1.028 | 4.227 | 2213. | .8236 | .9246 | .8566 | 24.68 | .7753 | .000543 |
| 1.069 | 4.394 | 2301. | .8287 | .9266 | .8609 | 24.82 | .7600 | .000574 |
| 1.104 | 4.541 | 2377. | .8351 | .9291 | .8664 | 24.99 | .7463 | .000601 |
| 1.144 | 4.702 | 2462. | .8426 | .9320 | .8728 | 25.18 | .7306 | .000632 |
| 1.199 | 4.890 | 2560. | .8482 | .9342 | .8775 | 25.33 | .7118 | .000669 |
| 1.219 | 5.010 | 2623. | .8514 | .9355 | .8803 | 25.41 | .6994 | .000694 |

| TABLE A11. (CONT.) | | | | | | | | |
|--------------------|---------|--------|--------|-----------|--------|--------|-------------|---------|
| Y (CM) | Y/THETA | Y-PLUS | M/MF | RHO/RHORE | U/UE | U-PLUS | TAU/TAU-MAX | V/U |
| 1.262 | 5.189 | 2716. | .8600 | .9389 | .8875 | 25.64 | .6807 | .000730 |
| 1.322 | 5.433 | 2844. | .8654 | .9411 | .8921 | 25.78 | .6540 | .000781 |
| 1.371 | 5.637 | 2951. | .8724 | .9440 | .8979 | 25.96 | .6311 | .000824 |
| 1.417 | 5.825 | 3049. | .8796 | .9469 | .9039 | 26.15 | .6094 | .000865 |
| 1.456 | 5.986 | 3134. | .8844 | .9489 | .9079 | 26.27 | .5903 | .000900 |
| 1.517 | 6.237 | 3265. | .8936 | .9528 | .9155 | 26.51 | .5601 | .000956 |
| 1.565 | 6.435 | 3369. | .8988 | .9549 | .9197 | 26.64 | .5357 | .001000 |
| 1.607 | 6.608 | 3459. | .9074 | .9586 | .9268 | 26.86 | .5141 | .001039 |
| 1.677 | 6.895 | 3610. | .9135 | .9612 | .9317 | 27.02 | .4776 | .001104 |
| 1.720 | 7.072 | 3702. | .9188 | .9634 | .9360 | 27.15 | .4547 | .001144 |
| 1.771 | 7.281 | 3812. | .9256 | .9664 | .9416 | 27.32 | .4276 | .001192 |
| 1.809 | 7.438 | 3894. | .9308 | .9687 | .9457 | 27.46 | .4072 | .001227 |
| 1.845 | 7.584 | 3970. | .9337 | .9699 | .9481 | 27.53 | .3880 | .001260 |
| 1.879 | 7.725 | 4044. | .9368 | .9713 | .9505 | 27.61 | .3696 | .001292 |
| 1.932 | 7.944 | 4159. | .9433 | .9741 | .9557 | 27.77 | .3409 | .001341 |
| 1.981 | 8.142 | 4263. | .9475 | .9760 | .9591 | 27.88 | .3146 | .001386 |
| 2.014 | 8.278 | 4334. | .9528 | .9784 | .9633 | 28.01 | .2974 | .001415 |
| 2.061 | 8.471 | 4435. | .9570 | .9807 | .9666 | 28.11 | .2776 | .001456 |
| 2.100 | 8.633 | 4520. | .9611 | .9821 | .9698 | 28.21 | .2570 | .001490 |
| 2.139 | 8.795 | 4604. | .9652 | .9839 | .9730 | 28.32 | .2317 | .001524 |
| 2.176 | 8.946 | 4684. | .9687 | .9855 | .9758 | 28.40 | .2130 | .001555 |
| 2.209 | 9.082 | 4755. | .9706 | .9864 | .9773 | 28.45 | .1964 | .001582 |
| 2.244 | 9.223 | 4828. | .9752 | .9885 | .9809 | 28.57 | .1795 | .001610 |
| 2.289 | 9.411 | 4977. | .9754 | .9886 | .9810 | 28.57 | .1575 | .001646 |
| 2.307 | 9.484 | 4965. | .9792 | .9903 | .9839 | 28.66 | .1492 | .001660 |
| 2.332 | 9.588 | 5020. | .9806 | .9910 | .9850 | 28.70 | .1374 | .001679 |
| 2.363 | 9.713 | 5085. | .9818 | .9915 | .9860 | 28.73 | .1235 | .001701 |
| 2.337 | 9.854 | 5159. | .9858 | .9934 | .9891 | 28.83 | .1083 | .001726 |
| 2.452 | 10.079 | 5277. | .9868 | .9938 | .9898 | 28.85 | .0850 | .001763 |
| 2.481 | 10.199 | 5339. | .9887 | .9947 | .9913 | 28.90 | .0731 | .001782 |
| 2.520 | 10.361 | 5424. | .9906 | .9956 | .9928 | 28.94 | .0577 | .001807 |
| 2.571 | 10.569 | 5533. | .9918 | .9961 | .9937 | 28.97 | .0389 | .001837 |
| 2.607 | 10.716 | 5610. | .9937 | .9970 | .9951 | 29.02 | .0265 | .001857 |
| 2.632 | 10.820 | 5665. | .9946 | .9975 | .9959 | 29.04 | .0181 | .001870 |
| 2.670 | 10.976 | 5747. | .9954 | .9978 | .9965 | 29.06 | .0061 | .001889 |
| 2.716 | 11.164 | 5845. | .9967 | .9984 | .9975 | 29.09 | 0.0000 | .001899 |
| 2.764 | 11.363 | 5949. | .9971 | .9986 | .9978 | 29.10 | 0.0000 | .001899 |
| 2.840 | 11.676 | 6113. | .9990 | .9995 | .9992 | 29.15 | 0.0000 | .001899 |
| 2.937 | 12.073 | 6320. | .9984 | .9993 | .9988 | 29.14 | 0.0000 | .001899 |
| 3.039 | 12.490 | 6539. | .9992 | .9996 | .9994 | 29.16 | 0.0000 | .001899 |
| 3.135 | 12.887 | 6747. | .9996 | .9998 | .9997 | 29.16 | 0.0000 | .001899 |
| 3.249 | 13.351 | 6990. | .9990 | .9995 | .9993 | 29.15 | 0.0000 | .001899 |
| 3.364 | 13.826 | 7239. | .9990 | .9995 | .9993 | 29.15 | 0.0000 | .001899 |
| 3.460 | 14.273 | 7446. | .9998 | .9999 | .9998 | 29.17 | 0.0000 | .001899 |
| 3.562 | 14.641 | 7665. | .9998 | .9999 | .9998 | 29.17 | 0.0000 | .001899 |
| 3.601 | 14.893 | 7750. | 1.0002 | 1.0001 | 1.0001 | 29.18 | 0.0000 | .001899 |
| 3.635 | 14.943 | 7874. | 1.0003 | 1.0001 | 1.0003 | 29.18 | 0.0000 | .001899 |
| 3.671 | 15.090 | 7900. | .9996 | .9998 | .9997 | 29.17 | 0.0000 | .001899 |

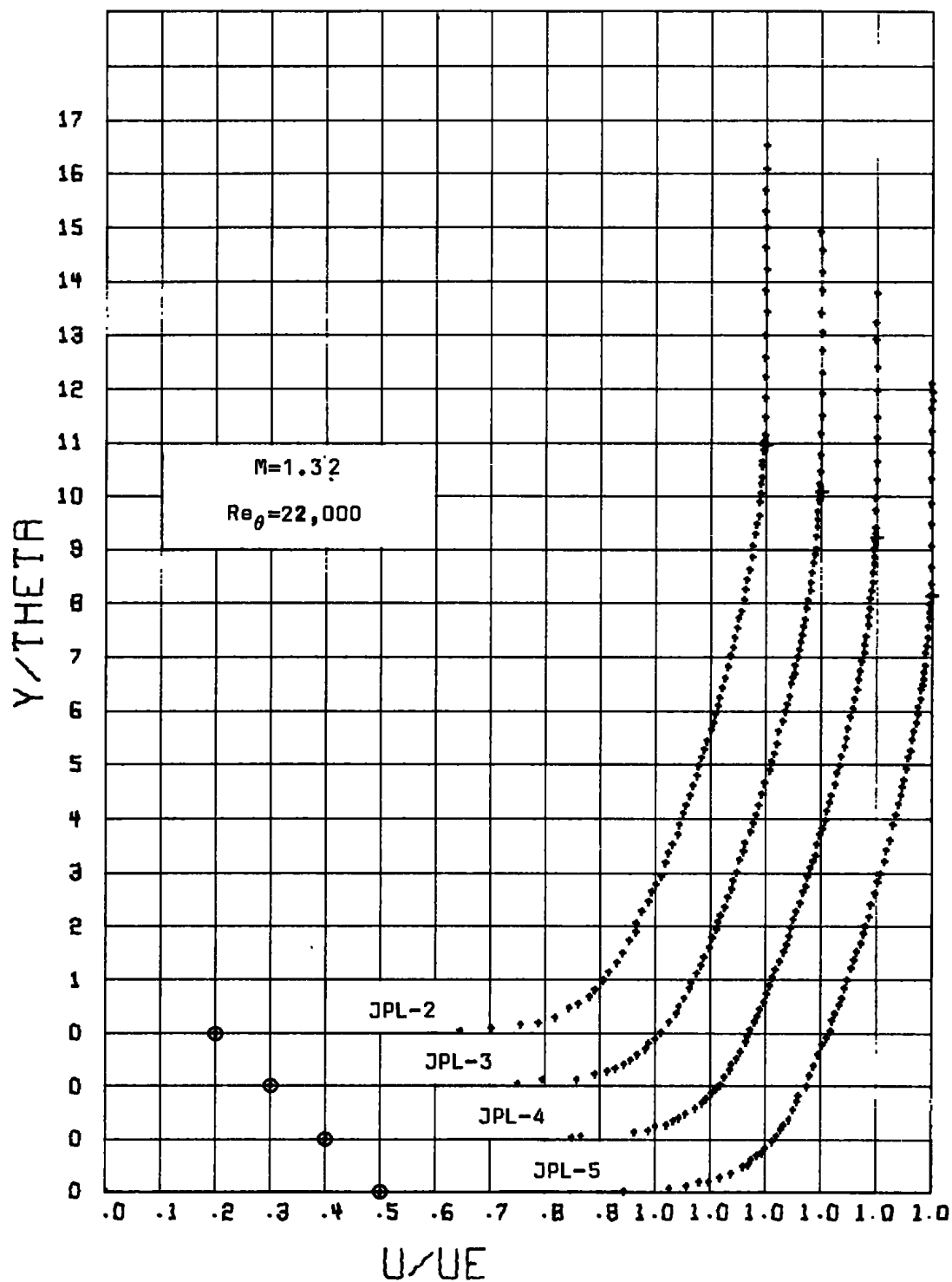


Figure A29. Mean Velocity Profiles.

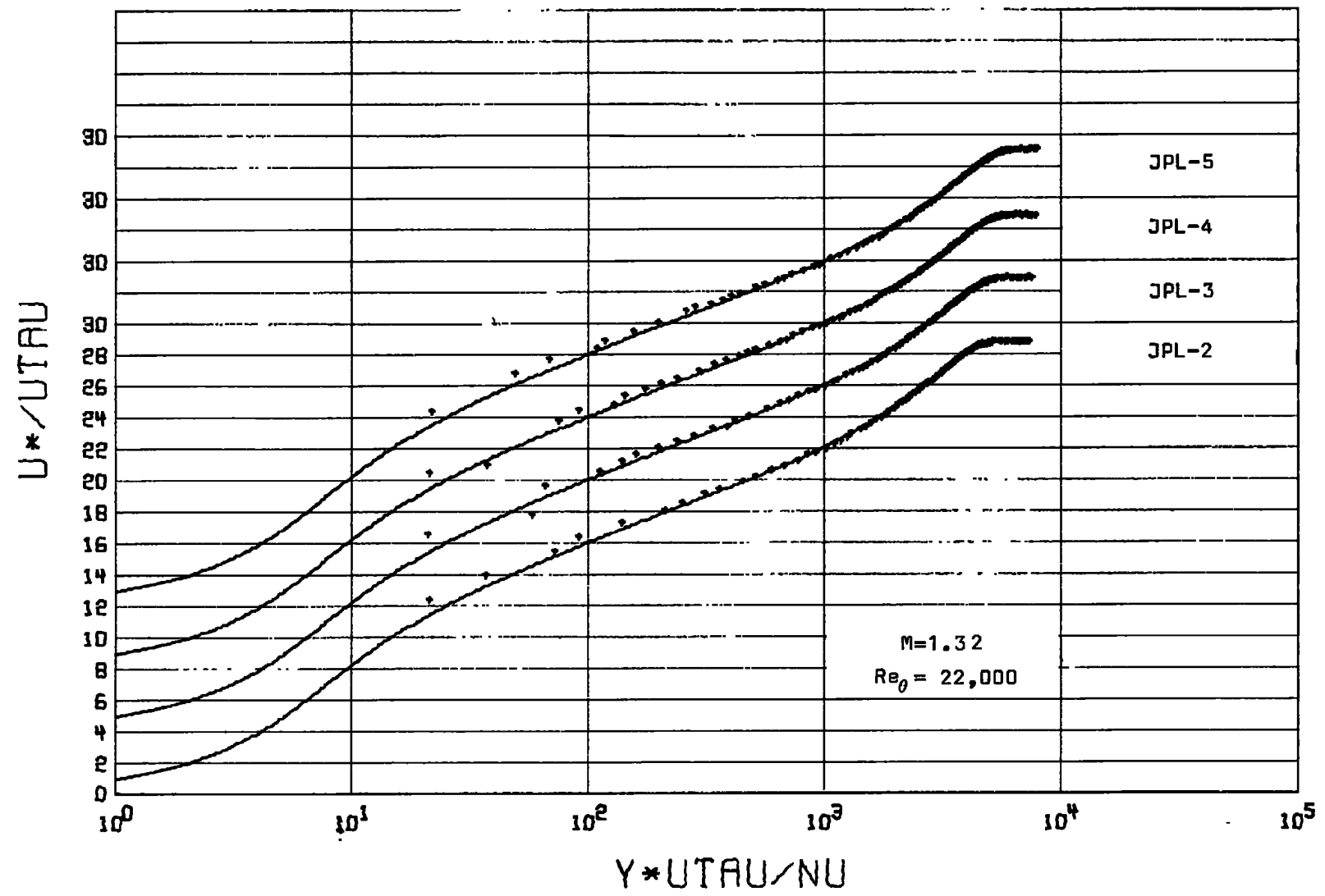


Figure A30. Van Driest Scaled Mean Velocity Profiles.

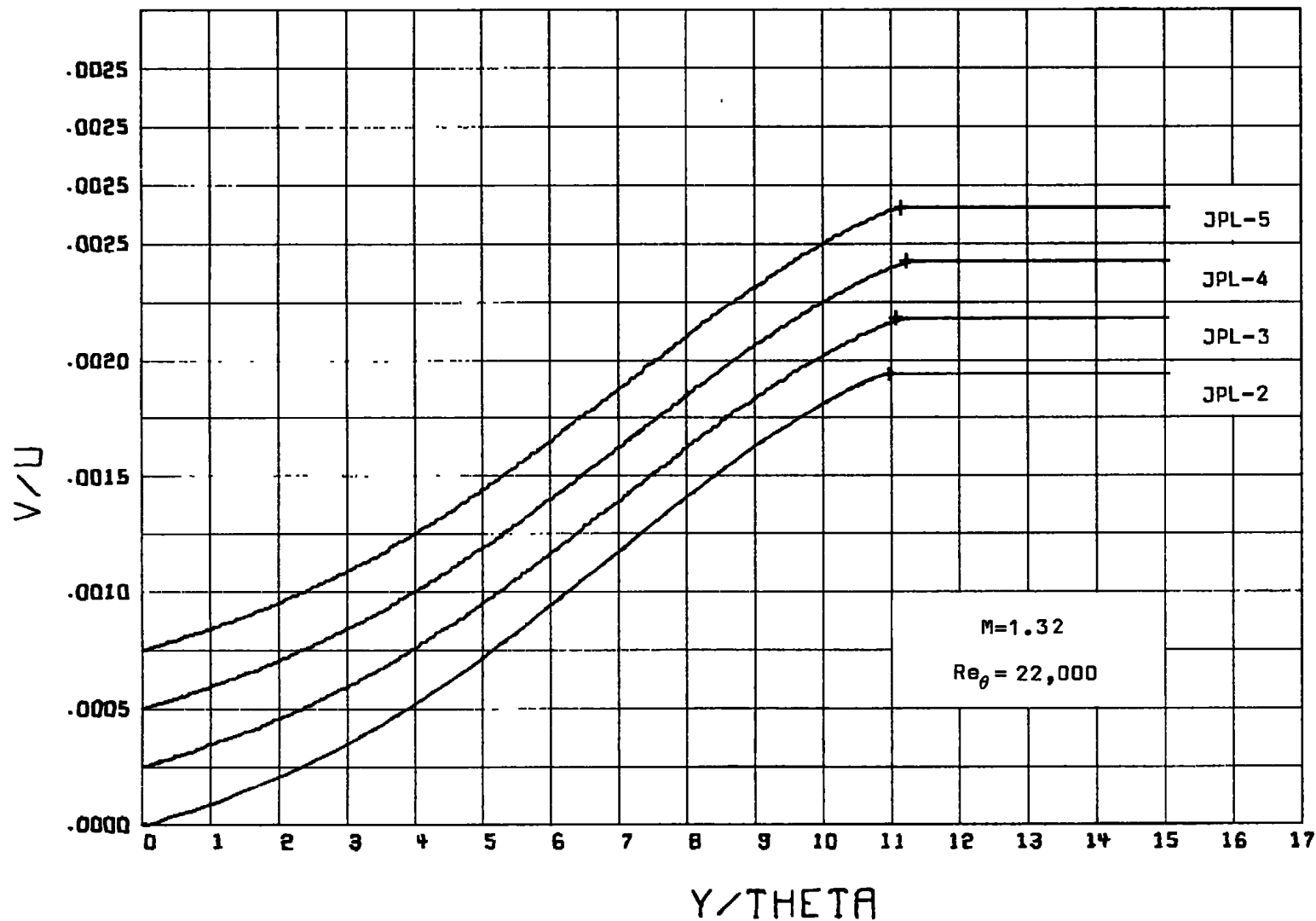


Figure A 31. Normal Velocity Distribution.

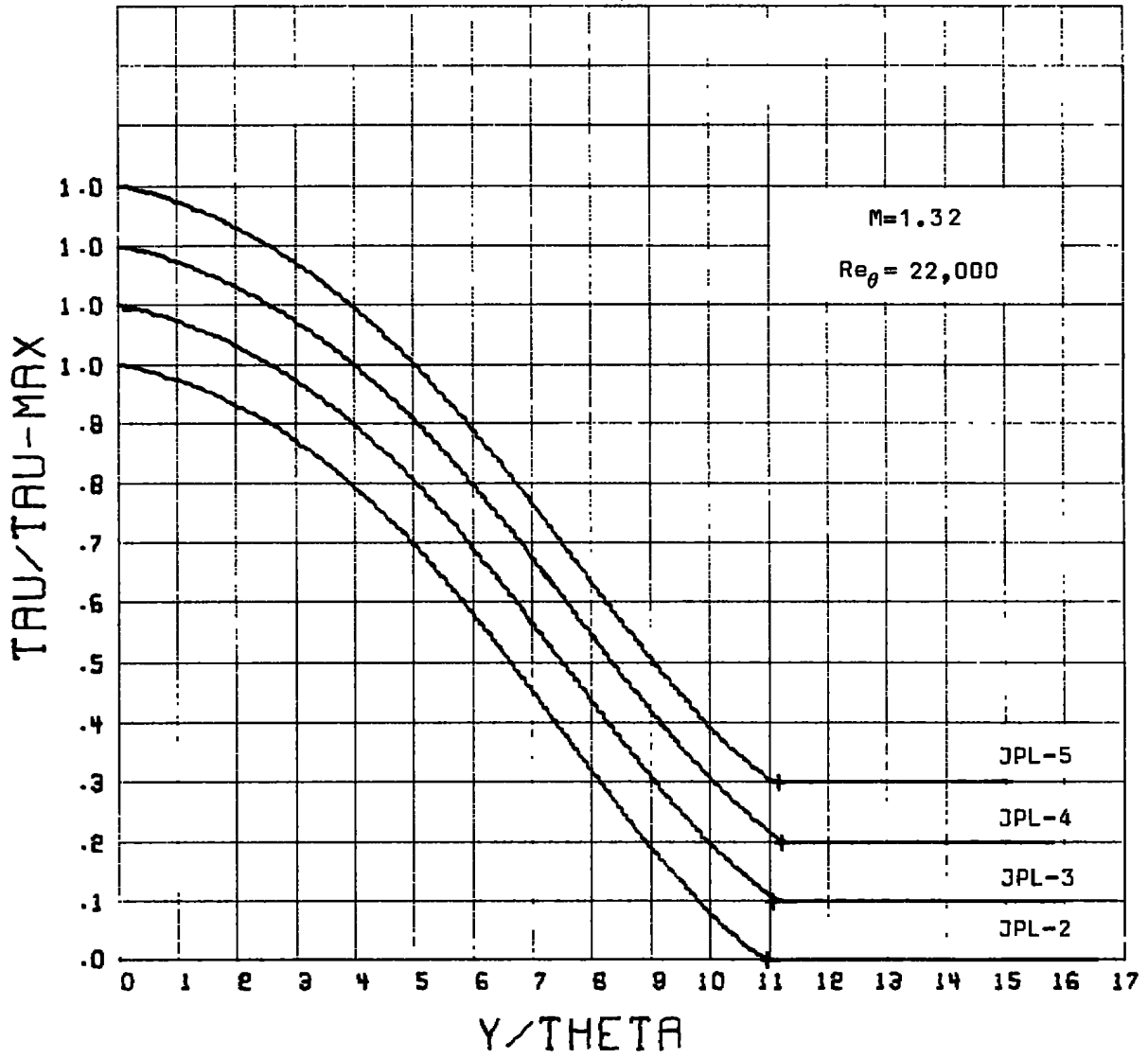


Figure A 32. Shear Stress Distribution.

TABLE A12. DATA SUMMARY
PROFILE - JPL-2 - - - PITOT PRESSURE DATA

EDGE MACH NO.= 1.3082
X=-26.21 CM

TOTAL PRESSURE= .1333E+06 N/M**2
TOTAL TEMPRATURF= 324.67 DEG-K

UE= 40R.33 M/SEC
RE-DELTA-STAR= 72400.

DELTA STAR= .3783 CM
RE-THETA= 37230.

THETA= .1945 CM
NUWALL= .3710 CM**2/SEC

H= 1.944

LEAST SQUARE FIT PARAMETERS

UTAU= 14.1549 M/SEC
CHISQR= .4842F-05

CF= .001844
YMAX= 2.076 CM

P1= .6272
YMIN= .050 CM

DELTA= 2.2149 CM

| Y (CM) | Y/THETA | Y-PLUS | M/ME | RHO/RHOF | U/UE | U-PLUS | TAU/TAU-MAX | V/U |
|--------|---------|--------|--------|----------|--------|--------|-------------|----------|
| 0.000 | 0.000 | 0. | 0.0000 | .7674 | 0.0000 | 0.00 | 1.0000 | 0.000000 |
| .011 | .058 | 43. | .4300 | .8104 | .4776 | 13.90 | 1.0000 | 0.000000 |
| .022 | .117 | 87. | .4953 | .8245 | .5455 | 15.92 | .9989 | .000005 |
| .050 | .261 | 193. | .5510 | .8381 | .6019 | 17.61 | .9958 | .000017 |
| .066 | .339 | 251. | .5803 | .8458 | .6310 | 18.49 | .9939 | .000023 |
| .079 | .404 | 300. | .6073 | .8518 | .6526 | 19.15 | .9921 | .000029 |
| .100 | .515 | 382. | .6170 | .8560 | .6669 | 19.58 | .9890 | .000039 |
| .111 | .574 | 426. | .6257 | .8585 | .6753 | 19.84 | .9873 | .000044 |
| .129 | .665 | 494. | .6365 | .8617 | .6857 | 20.16 | .9845 | .000052 |
| .142 | .731 | 542. | .6479 | .8651 | .6966 | 20.49 | .9825 | .000058 |
| .172 | .887 | 658. | .6562 | .8676 | .7045 | 20.73 | .9773 | .000072 |
| .193 | .992 | 736. | .6701 | .8719 | .7176 | 21.13 | .9737 | .000081 |
| .223 | 1.148 | 852. | .6828 | .8759 | .7296 | 21.50 | .9679 | .000096 |
| .245 | 1.259 | 935. | .6912 | .8785 | .7374 | 21.75 | .9637 | .000107 |
| .275 | 1.416 | 1051. | .7041 | .8827 | .7494 | 22.11 | .9575 | .000122 |
| .302 | 1.553 | 1153. | .7096 | .8845 | .7544 | 22.27 | .9517 | .000136 |
| .317 | 1.631 | 1211. | .7152 | .8864 | .7597 | 22.43 | .9483 | .000144 |
| .341 | 1.755 | 1303. | .7225 | .8888 | .7664 | 22.64 | .9429 | .000157 |
| .365 | 1.880 | 1395. | .7315 | .8919 | .7746 | 22.90 | .9371 | .000170 |
| .388 | 1.997 | 1482. | .7339 | .8927 | .7768 | 22.96 | .9315 | .000182 |
| .429 | 2.206 | 1637. | .7451 | .8966 | .7869 | 23.28 | .9210 | .000206 |
| .457 | 2.350 | 1744. | .7519 | .8989 | .7931 | 23.47 | .9135 | .000223 |
| .490 | 2.519 | 1870. | .7580 | .9011 | .7986 | 23.64 | .9041 | .000243 |
| .518 | 2.663 | 1976. | .7657 | .9038 | .8055 | 23.86 | .8959 | .000260 |
| .560 | 2.878 | 2136. | .7751 | .9071 | .8138 | 24.12 | .8828 | .000288 |
| .599 | 3.081 | 2287. | .7841 | .9104 | .8217 | 24.37 | .8699 | .000315 |
| .637 | 3.276 | 2432. | .7880 | .9119 | .8252 | 24.48 | .8567 | .000342 |
| .670 | 3.446 | 2558. | .7959 | .9147 | .8321 | 24.70 | .8448 | .000366 |
| .703 | 3.616 | 2684. | .8049 | .9181 | .8400 | 24.95 | .8324 | .000390 |
| .739 | 3.799 | 2820. | .8128 | .9211 | .8469 | 25.16 | .8183 | .000418 |
| .769 | 3.955 | 2936. | .8171 | .9227 | .8506 | 25.28 | .8060 | .000442 |
| .797 | 4.099 | 3042. | .8235 | .9251 | .8562 | 25.46 | .7942 | .000465 |
| .828 | 4.256 | 3159. | .8279 | .9268 | .8599 | 25.58 | .7809 | .000490 |
| .866 | 4.452 | 3304. | .8376 | .9306 | .8682 | 25.84 | .7637 | .000523 |
| .889 | 4.569 | 3391. | .8407 | .9318 | .8709 | 25.92 | .7531 | .000543 |
| .919 | 4.719 | 3503. | .8466 | .9341 | .8759 | 26.08 | .7391 | .000569 |
| .957 | 4.922 | 3653. | .8514 | .9360 | .8800 | 26.21 | .7197 | .000604 |
| .993 | 5.104 | 3789. | .8601 | .9395 | .8874 | 26.45 | .7016 | .000637 |
| 1.027 | 5.281 | 3920. | .8647 | .9413 | .8913 | 26.57 | .6836 | .000670 |
| 1.051 | 5.457 | 4050. | .8704 | .9436 | .8960 | 26.73 | .6648 | .000703 |
| 1.097 | 5.640 | 4186. | .8754 | .9456 | .9002 | 26.86 | .6454 | .000738 |

| Y (CM) | Y/THETA | Y-PLUS | TABLE A12. (CONT.) | | U/UE | U-PLUS | TAU/TAU-MAX | V/U |
|--------|---------|--------|--------------------|----------|--------|--------|-------------|---------|
| | | | M/ME | RHO/RHOF | | | | |
| 1.132 | 5.822 | 4322. | .8823 | .9485 | .9059 | 27.04 | .6252 | .000773 |
| 1.158 | 5.953 | 4419. | .8860 | .9500 | .9090 | 27.14 | .6105 | .000799 |
| 1.181 | 6.123 | 4545. | .8913 | .9522 | .9134 | 27.28 | .5910 | .000832 |
| 1.229 | 6.318 | 4690. | .8983 | .9551 | .9192 | 27.47 | .5682 | .000872 |
| 1.261 | 6.492 | 4811. | .9020 | .9566 | .9222 | 27.56 | .5488 | .000905 |
| 1.292 | 6.645 | 4932. | .9079 | .9591 | .9271 | 27.72 | .5290 | .000938 |
| 1.325 | 6.815 | 5058. | .9125 | .9611 | .9308 | 27.84 | .5084 | .000973 |
| 1.356 | 6.971 | 5174. | .9172 | .9630 | .9346 | 27.96 | .4890 | .001005 |
| 1.388 | 7.134 | 5296. | .9216 | .9650 | .9382 | 28.08 | .4687 | .001038 |
| 1.432 | 7.363 | 5465. | .9256 | .9667 | .9414 | 28.19 | .4400 | .001085 |
| 1.457 | 7.494 | 5562. | .9305 | .9688 | .9453 | 28.31 | .4236 | .001112 |
| 1.496 | 7.689 | 5707. | .9349 | .9707 | .9489 | 28.43 | .3987 | .001153 |
| 1.529 | 7.859 | 5833. | .9403 | .9730 | .9532 | 28.57 | .3772 | .001187 |
| 1.569 | 8.068 | 5989. | .9436 | .9745 | .9559 | 28.65 | .3507 | .001230 |
| 1.607 | 8.264 | 6134. | .9495 | .9771 | .9606 | 28.81 | .3259 | .001269 |
| 1.637 | 8.414 | 6245. | .9529 | .9786 | .9632 | 28.89 | .3071 | .001299 |
| 1.681 | 8.642 | 6415. | .9574 | .9806 | .9668 | 29.01 | .2786 | .001343 |
| 1.711 | 8.799 | 6531. | .9601 | .9818 | .9690 | 29.08 | .2593 | .001373 |
| 1.752 | 9.008 | 6686. | .9656 | .9843 | .9733 | 29.22 | .2339 | .001413 |
| 1.785 | 9.178 | 6817. | .9692 | .9859 | .9761 | 29.31 | .2137 | .001444 |
| 1.826 | 9.387 | 6967. | .9719 | .9871 | .9782 | 29.38 | .1893 | .001482 |
| 1.856 | 9.543 | 7084. | .9750 | .9885 | .9806 | 29.46 | .1712 | .001509 |
| 1.897 | 9.752 | 7239. | .9783 | .9900 | .9832 | 29.55 | .1483 | .001544 |
| 1.925 | 9.896 | 7345. | .9800 | .9908 | .9846 | 29.59 | .1329 | .001568 |
| 1.953 | 10.039 | 7452. | .9833 | .9923 | .9871 | 29.67 | .1179 | .001590 |
| 1.993 | 10.248 | 7607. | .9844 | .9928 | .9880 | 29.70 | .0965 | .001623 |
| 2.024 | 10.405 | 7723. | .9868 | .9939 | .9898 | 29.76 | .0817 | .001645 |
| 2.051 | 10.542 | 7825. | .9885 | .9947 | .9911 | 29.81 | .0690 | .001664 |
| 2.076 | 10.673 | 7927. | .9902 | .9954 | .9924 | 29.85 | .0570 | .001682 |
| 2.115 | 10.975 | 8072. | .9912 | .9959 | .9932 | 29.87 | .0403 | .001707 |
| 2.147 | 11.038 | 8193. | .9927 | .9966 | .9944 | 29.91 | .0275 | .001726 |
| 2.176 | 11.189 | 8305. | .9936 | .9970 | .9951 | 29.94 | .0163 | .001742 |
| 2.207 | 11.345 | 8421. | .9939 | .9972 | .9953 | 29.94 | .0055 | .001758 |
| 2.232 | 11.476 | 8518. | .9945 | .9974 | .9958 | 29.96 | 0.0000 | .001766 |
| 2.269 | 11.665 | 8658. | .9953 | .9978 | .9964 | 29.98 | 0.0000 | .001766 |
| 2.341 | 12.037 | 8935. | .9969 | .9985 | .9976 | 30.02 | 0.0000 | .001766 |
| 2.423 | 12.455 | 9245. | .9989 | .9995 | .9991 | 30.07 | 0.0000 | .001766 |
| 2.514 | 12.925 | 9594. | .9994 | .9997 | .9995 | 30.08 | 0.0000 | .001766 |
| 2.599 | 13.362 | 9918. | .9995 | .9997 | .9996 | 30.08 | 0.0000 | .001766 |
| 2.679 | 13.773 | 10224. | .9990 | .9995 | .9992 | 30.07 | 0.0000 | .001766 |
| 2.764 | 14.211 | 10548. | .9991 | .9996 | .9993 | 30.07 | 0.0000 | .001766 |
| 2.840 | 14.602 | 10839. | .9998 | .9999 | .9999 | 30.09 | 0.0000 | .001766 |
| 2.918 | 15.001 | 11134. | .9998 | .9999 | .9998 | 30.09 | 0.0000 | .001766 |
| 2.989 | 15.366 | 11406. | .9998 | .9999 | .9998 | 30.09 | 0.0000 | .001766 |
| 3.063 | 15.745 | 11687. | 1.0004 | 1.0002 | 1.0003 | 30.11 | 0.0000 | .001766 |
| 3.135 | 16.117 | 11963. | 1.0005 | 1.0002 | 1.0004 | 30.11 | 0.0000 | .001766 |
| 3.199 | 16.443 | 12205. | 1.0007 | 1.0003 | 1.0005 | 30.12 | 0.0000 | .001766 |

TABLE A12. (CONT.)
 PROFILE - JPL-3 - - - PITOT PRESSURE DATA

EDGE MACH NO.= 1.3173 TOTAL PRESSURE= .1335E+06 N/M**2
 X= -7.62 CM TOTAL TEMPERATURE= 322.72 DEG-K

UE= 409.20 M/SEC DELTA STAR= .3969 CM THETA= .2047 CM " H= 1.938
 RF-DELTA-STAR= 72780. RE-THETA= 37550. NUWALL= .3709 CM**2/SEC

LEAST SQUARE FIT PARAMETERS
 UTAU= 14.2605 M/SEC CF= .001858 PI= .5508 DELTA= 2.4022 CM
 CHISQR= .2328E-04 YMAX= 2.244 CM YMIN= .036 CM

| Y (CM) | Y/THETA | Y-PLUS | M/ME | RHO/RHNE | U/UE | U-PLUS | TAU/TAU-MAX | V/U |
|--------|---------|--------|--------|----------|--------|--------|-------------|----------|
| 0.000 | 0.000 | 0. | 0.0000 | .7650 | 0.0000 | 0.00 | 1.0000 | 0.000000 |
| .010 | .049 | 39. | .4324 | .8089 | .4807 | 13.92 | 1.0000 | 0.000000 |
| .021 | .105 | 83. | .5077 | .8254 | .5582 | 16.72 | .9990 | .000005 |
| .036 | .179 | 141. | .5494 | .8359 | .6009 | 17.49 | .9974 | .000011 |
| .052 | .254 | 200. | .5795 | .8439 | .6308 | 18.39 | .9957 | .000017 |
| .063 | .310 | 244. | .6007 | .8498 | .6516 | 19.02 | .9942 | .000022 |
| .090 | .440 | 346. | .6142 | .8536 | .6648 | 19.42 | .9907 | .000034 |
| .105 | .514 | 405. | .6330 | .8592 | .6829 | 19.97 | .9885 | .000040 |
| .125 | .613 | 483. | .6440 | .8624 | .6934 | 20.29 | .9855 | .000049 |
| .151 | .737 | 581. | .6558 | .8661 | .7047 | 20.63 | .9815 | .000060 |
| .173 | .849 | 668. | .6656 | .8691 | .7140 | 20.92 | .9777 | .000071 |
| .194 | .948 | 747. | .6776 | .8729 | .7252 | 21.26 | .9742 | .000080 |
| .222 | 1.085 | 854. | .6847 | .8751 | .7319 | 21.47 | .9692 | .000093 |
| .248 | 1.215 | 957. | .6928 | .8778 | .7395 | 21.70 | .9642 | .000105 |
| .269 | 1.314 | 1035. | .7010 | .8805 | .7471 | 21.93 | .9603 | .000115 |
| .284 | 1.399 | 1093. | .7086 | .8830 | .7541 | 22.15 | .9572 | .000122 |
| .311 | 1.519 | 1194. | .7157 | .8853 | .7606 | 22.35 | .9518 | .000135 |
| .334 | 1.630 | 1284. | .7224 | .8876 | .7668 | 22.54 | .9469 | .000147 |
| .372 | 1.817 | 1430. | .7306 | .8904 | .7742 | 22.77 | .9385 | .000166 |
| .398 | 1.947 | 1533. | .7365 | .8924 | .7796 | 22.94 | .9324 | .000180 |
| .440 | 2.102 | 1655. | .7453 | .8955 | .7876 | 23.18 | .9248 | .000197 |
| .458 | 2.238 | 1762. | .7511 | .8975 | .7927 | 23.34 | .9178 | .000213 |
| .486 | 2.375 | 1870. | .7564 | .8994 | .7975 | 23.49 | .9106 | .000229 |
| .521 | 2.548 | 2006. | .7656 | .9027 | .8058 | 23.75 | .9011 | .000249 |
| .571 | 2.790 | 2197. | .7767 | .9067 | .8156 | 24.06 | .8871 | .000279 |
| .601 | 2.939 | 2314. | .7798 | .9079 | .8184 | 24.14 | .8781 | .000298 |
| .637 | 3.113 | 2451. | .7886 | .9111 | .8261 | 24.39 | .8671 | .000320 |
| .679 | 3.317 | 2612. | .7944 | .9133 | .8313 | 24.55 | .8537 | .000348 |
| .712 | 3.479 | 2739. | .8006 | .9156 | .8367 | 24.72 | .8426 | .000370 |
| .755 | 3.689 | 2905. | .8044 | .9178 | .8417 | 24.88 | .8275 | .000400 |
| .789 | 3.857 | 3037. | .8149 | .9210 | .8491 | 25.11 | .8151 | .000424 |
| .820 | 4.006 | 3154. | .8183 | .9224 | .8521 | 25.20 | .8036 | .000447 |
| .864 | 4.273 | 3325. | .8261 | .9253 | .8587 | 25.41 | .7863 | .000480 |
| .905 | 4.421 | 3481. | .8346 | .9287 | .8660 | 25.64 | .7698 | .000512 |
| .935 | 4.570 | 3598. | .8389 | .9304 | .8697 | 25.76 | .7569 | .000536 |
| .981 | 4.793 | 3774. | .8477 | .9338 | .8772 | 25.99 | .7371 | .000573 |
| 1.027 | 5.016 | 3950. | .8543 | .9365 | .8828 | 26.17 | .7165 | .000611 |
| 1.061 | 5.194 | 4082. | .8593 | .9385 | .8870 | 26.31 | .7003 | .000640 |
| 1.111 | 5.426 | 4272. | .8678 | .9420 | .8941 | 26.53 | .6766 | .000683 |
| 1.144 | 5.587 | 4399. | .8745 | .9447 | .8997 | 26.71 | .6603 | .000713 |
| 1.179 | 5.761 | 4536. | .8785 | .9464 | .9031 | 26.82 | .6425 | .000744 |

| Y (CM) | Y/THETA | Y-PLUS | TABLE A12. (CONT.) M/ME | RHO/RHO _E | U/UE | U-PLUS | TAU/TAU-MAX | V/U |
|--------|---------|--------|----------------------------|----------------------|--------|--------|-------------|---------|
| 1.217 | 5.947 | 4682. | .8879 | .9482 | .9067 | 26.93 | .6228 | .000779 |
| 1.250 | 6.108 | 4809. | .8874 | .9500 | .9104 | 27.05 | .6054 | .000910 |
| 1.283 | 6.269 | 4936. | .8936 | .9526 | .9155 | 27.22 | .5877 | .000840 |
| 1.319 | 6.443 | 5073. | .8993 | .9550 | .9202 | 27.37 | .5683 | .000874 |
| 1.360 | 6.641 | 5229. | .9041 | .9571 | .9241 | 27.49 | .5457 | .000912 |
| 1.395 | 6.815 | 5365. | .9094 | .9593 | .9285 | 27.63 | .5257 | .000947 |
| 1.423 | 6.951 | 5473. | .9148 | .9616 | .9329 | 27.77 | .5098 | .000973 |
| 1.463 | 7.144 | 5625. | .9188 | .9634 | .9361 | 27.88 | .4871 | .001017 |
| 1.494 | 7.299 | 5747. | .9238 | .9655 | .9401 | 28.01 | .4686 | .001042 |
| 1.534 | 7.491 | 5898. | .9285 | .9676 | .9439 | 28.13 | .4455 | .001081 |
| 1.565 | 7.646 | 6020. | .9321 | .9692 | .9468 | 28.22 | .4268 | .001111 |
| 1.601 | 7.820 | 6157. | .9360 | .9709 | .9499 | 28.32 | .4058 | .001146 |
| 1.639 | 8.006 | 6303. | .9409 | .9730 | .9538 | 28.45 | .3831 | .001183 |
| 1.680 | 8.204 | 6460. | .9447 | .9747 | .9569 | 28.55 | .3590 | .001222 |
| 1.720 | 8.402 | 6616. | .9488 | .9765 | .9601 | 28.65 | .3349 | .001261 |
| 1.748 | 8.539 | 6723. | .9506 | .9773 | .9615 | 28.70 | .3184 | .001287 |
| 1.797 | 8.775 | 6909. | .9578 | .9805 | .9672 | 28.88 | .2900 | .001332 |
| 1.835 | 8.961 | 7055. | .9617 | .9823 | .9703 | 28.98 | .2678 | .001367 |
| 1.863 | 9.097 | 7163. | .9637 | .9832 | .9718 | 29.03 | .2517 | .001393 |
| 1.905 | 9.302 | 7324. | .9673 | .9849 | .9747 | 29.13 | .2279 | .001430 |
| 1.949 | 9.519 | 7495. | .9720 | .9870 | .9784 | 29.25 | .2030 | .001469 |
| 1.993 | 9.736 | 7666. | .9750 | .9884 | .9807 | 29.32 | .1787 | .001507 |
| 2.023 | 9.878 | 7778. | .9789 | .9902 | .9837 | 29.42 | .1631 | .001531 |
| 2.063 | 10.077 | 7934. | .9809 | .9911 | .9853 | 29.47 | .1419 | .001563 |
| 2.096 | 10.238 | 8061. | .9838 | .9924 | .9875 | 29.55 | .1252 | .001589 |
| 2.127 | 10.387 | 8178. | .9852 | .9931 | .9886 | 29.58 | .1101 | .001612 |
| 2.167 | 10.585 | 8335. | .9875 | .9941 | .9904 | 29.64 | .0908 | .001642 |
| 2.217 | 10.827 | 8525. | .9900 | .9953 | .9923 | 29.70 | .0683 | .001676 |
| 2.244 | 10.958 | 8628. | .9907 | .9956 | .9929 | 29.72 | .0567 | .001693 |
| 2.286 | 11.162 | 8789. | .9920 | .9962 | .9938 | 29.75 | .0394 | .001720 |
| 2.327 | 11.367 | 8950. | .9951 | .9977 | .9962 | 29.83 | .0231 | .001744 |
| 2.343 | 11.441 | 9009. | .9947 | .9975 | .9959 | 29.82 | .0175 | .001753 |
| 2.373 | 11.590 | 9126. | .9954 | .9979 | .9965 | 29.84 | .0066 | .001769 |
| 2.413 | 11.782 | 9277. | .9966 | .9984 | .9974 | 29.87 | 0.0000 | .001779 |
| 2.459 | 12.012 | 9458. | .9970 | .9986 | .9977 | 29.88 | 0.0000 | .001779 |
| 2.526 | 12.334 | 9712. | .9980 | .9990 | .9985 | 29.90 | 0.0000 | .001779 |
| 2.600 | 12.700 | 10000. | .9991 | .9996 | .9993 | 29.93 | 0.0000 | .001779 |
| 2.653 | 13.004 | 10239. | .9994 | .9997 | .9995 | 29.94 | 0.0000 | .001779 |
| 2.743 | 13.395 | 10547. | .9993 | .9997 | .9995 | 29.94 | 0.0000 | .001779 |
| 2.835 | 13.847 | 10903. | .9995 | .9998 | .9996 | 29.94 | 0.0000 | .001779 |
| 2.932 | 14.319 | 11274. | 1.0004 | 1.0001 | 1.0003 | 29.96 | 0.0000 | .001779 |
| 3.036 | 14.827 | 11675. | 1.0006 | 1.0003 | 1.0005 | 29.97 | 0.0000 | .001779 |
| 3.110 | 15.187 | 11958. | 1.0003 | 1.0001 | 1.0002 | 29.96 | 0.0000 | .001779 |
| 3.186 | 15.559 | 12251. | .9998 | .9999 | .9998 | 29.95 | 0.0000 | .001779 |
| 3.287 | 16.030 | 12622. | .9999 | .9999 | .9999 | 29.95 | 0.0000 | .001779 |
| 3.371 | 16.464 | 12964. | .9998 | .9999 | .9998 | 29.95 | 0.0000 | .001779 |

TABLE A12. (CONT.)
PROFILE - JPL-4 - - - PITOT PRESSURE DATA

EDGE MACH NO.= 1.3125
X= 0.00 CM

TOTAL PRESSURE= .1339F+06. N/M**2
TOTAL TEMPERATURE= 323.70 DEG-K

UE= 408.71 M/SEC
RE-DELTA-STAR= 73130.

DELTA STAR= .4061 CM
RE-THETA= 37900.

THETA= .2104 CM
NUWALL= .3685 CM**2/SEC

H= 1.929
CF= .001788

LEAST SQUARE FIT PARAMETERS

UTAU= 14.2391 M/SEC
CHISQR= .2778E-04

CF= .001860
YMAX= 2.341 CM

PI= .5314
YMIN= .038 CM

DELTA= 2.4868 CM

| Y (CM) | Y/THETA | Y-PLUS | M/ME | RHO/RHO* | U/UF | U-PLUS | TAU/TAU-MAX | V/U |
|--------|---------|--------|--------|----------|--------|--------|-------------|----------|
| 0.000 | 0.000 | 0. | 0.0000 | .7663 | 0.0000 | 0.00 | 1.0000 | 0.000000 |
| .010 | .048 | 39. | .4237 | .8082 | .4712 | 13.64 | 1.0000 | 0.000000 |
| .020 | .096 | 78. | .5008 | .8249 | .5514 | 16.02 | .9991 | .000004 |
| .029 | .138 | 112. | .5395 | .8343 | .5906 | 17.19 | .9982 | .000008 |
| .038 | .181 | 147. | .5611 | .8399 | .6123 | 17.84 | .9973 | .000011 |
| .052 | .247 | 201. | .5812 | .8452 | .6322 | 18.44 | .9957 | .000017 |
| .066 | .313 | 255. | .5919 | .8481 | .6427 | 18.75 | .9940 | .000023 |
| .083 | .398 | 323. | .6167 | .8552 | .6669 | 19.49 | .9917 | .000030 |
| .099 | .470 | 382. | .6292 | .8589 | .6789 | 19.85 | .9897 | .000037 |
| .121 | .579 | 471. | .6422 | .8627 | .6914 | 20.23 | .9864 | .000046 |
| .148 | .705 | 574. | .6551 | .8666 | .7038 | 20.61 | .9823 | .000058 |
| .165 | .794 | 637. | .6686 | .8707 | .7165 | 21.00 | .9797 | .000065 |
| .190 | .905 | 736. | .6764 | .8732 | .7238 | 21.22 | .9755 | .000076 |
| .213 | 1.013 | 824. | .6846 | .8758 | .7315 | 21.46 | .9715 | .000086 |
| .236 | 1.122 | 912. | .6923 | .8783 | .7387 | 21.68 | .9674 | .000097 |
| .262 | 1.248 | 1015. | .6985 | .8803 | .7445 | 21.86 | .9625 | .000109 |
| .283 | 1.345 | 1094. | .7060 | .8828 | .7514 | 22.07 | .9586 | .000118 |
| .304 | 1.448 | 1177. | .7136 | .8853 | .7584 | 22.29 | .9543 | .000129 |
| .330 | 1.568 | 1275. | .7223 | .8882 | .7664 | 22.53 | .9492 | .000141 |
| .370 | 1.761 | 1432. | .7315 | .8913 | .7748 | 22.79 | .9406 | .000161 |
| .397 | 1.888 | 1536. | .7373 | .8933 | .7800 | 22.95 | .9346 | .000174 |
| .436 | 2.075 | 1688. | .7461 | .8964 | .7881 | 23.20 | .9256 | .000195 |
| .473 | 2.250 | 1830. | .7515 | .8983 | .7929 | 23.35 | .9167 | .000214 |
| .505 | 2.401 | 1953. | .7574 | .9003 | .7982 | 23.52 | .9087 | .000232 |
| .537 | 2.552 | 2075. | .7684 | .9043 | .8080 | 23.82 | .9004 | .000249 |
| .571 | 2.715 | 2208. | .7742 | .9063 | .8132 | 23.98 | .8911 | .000269 |
| .601 | 2.859 | 2326. | .7778 | .9077 | .8164 | 24.09 | .8825 | .000287 |
| .641 | 3.046 | 2478. | .7849 | .9103 | .8227 | 24.28 | .8710 | .000311 |
| .678 | 3.221 | 2620. | .7935 | .9134 | .8303 | 24.52 | .8597 | .000334 |
| .713 | 3.390 | 2757. | .7991 | .9155 | .8352 | 24.67 | .8485 | .000356 |
| .749 | 3.559 | 2895. | .8045 | .9175 | .8398 | 24.82 | .8368 | .000380 |
| .788 | 3.746 | 3047. | .8113 | .9201 | .8458 | 25.01 | .8233 | .000406 |
| .830 | 3.945 | 3209. | .8177 | .9226 | .8514 | 25.18 | .8084 | .000435 |
| .864 | 4.108 | 3341. | .8233 | .9247 | .8561 | 25.33 | .7957 | .000460 |
| .901 | 4.283 | 3484. | .8320 | .9281 | .8637 | 25.57 | .7817 | .000487 |
| .942 | 4.525 | 3680. | .8364 | .9298 | .8674 | 25.69 | .7615 | .000525 |
| .985 | 4.682 | 3808. | .8444 | .9329 | .8742 | 25.90 | .7479 | .000550 |
| 1.026 | 4.875 | 3965. | .8492 | .9348 | .8783 | 26.03 | .7307 | .000582 |
| 1.062 | 5.050 | 4107. | .8577 | .9382 | .8855 | 26.26 | .7144 | .000612 |
| 1.143 | 5.420 | 4416. | .8694 | .9429 | .8953 | 26.57 | .6781 | .000678 |
| 1.106 | 5.255 | 4274. | .8623 | .9401 | .8894 | 26.39 | .6760 | .000681 |

| Y (CM) | Y/THETA | Y-PLUS | TABLE A12. (CONT.) M/ME | RHO/RHNE | U/UE | H-PLUS | TAU/TAU-MAX | V/U |
|--------|---------|--------|----------------------------|----------|--------|--------|-------------|---------|
| 1.193 | 5.423 | 4573. | .8758 | .9455 | .9006 | 26.74 | .6588 | .000712 |
| 1.221 | 5.804 | 4720. | .8813 | .9478 | .9052 | 26.89 | .6403 | .000745 |
| 1.257 | 5.949 | 4838. | .8850 | .9493 | .9083 | 26.99 | .6249 | .000772 |
| 1.297 | 6.166 | 5015. | .8909 | .9518 | .9132 | 27.14 | .6019 | .000812 |
| 1.338 | 6.359 | 5172. | .8966 | .9542 | .9179 | 27.30 | .5809 | .000848 |
| 1.369 | 6.504 | 5290. | .8999 | .9555 | .9206 | 27.38 | .5648 | .000874 |
| 1.407 | 6.685 | 5437. | .9046 | .9575 | .9245 | 27.51 | .5444 | .000911 |
| 1.449 | 6.884 | 5599. | .9106 | .9601 | .9294 | 27.66 | .5217 | .000949 |
| 1.480 | 7.035 | 5722. | .9148 | .9619 | .9328 | 27.77 | .5042 | .000979 |
| 1.513 | 7.191 | 5849. | .9202 | .9641 | .9371 | 27.91 | .4859 | .001009 |
| 1.562 | 7.421 | 6036. | .9250 | .9667 | .9410 | 28.04 | .4589 | .001054 |
| 1.597 | 7.590 | 6173. | .9305 | .9686 | .9454 | 28.18 | .4388 | .001087 |
| 1.634 | 7.765 | 6315. | .9343 | .9703 | .9485 | 28.28 | .4179 | .001122 |
| 1.680 | 7.982 | 6492. | .9385 | .9721 | .9519 | 28.39 | .3918 | .001164 |
| 1.714 | 8.145 | 6624. | .9440 | .9745 | .9562 | 28.53 | .3722 | .001196 |
| 1.747 | 8.302 | 6752. | .9464 | .9756 | .9582 | 28.59 | .3533 | .001226 |
| 1.785 | 8.483 | 6899. | .9515 | .9779 | .9672 | 28.72 | .3316 | .001261 |
| 1.826 | 8.676 | 7056. | .9553 | .9796 | .9652 | 28.82 | .3085 | .001298 |
| 1.861 | 8.845 | 7194. | .9575 | .9805 | .9670 | 28.88 | .2884 | .001330 |
| 1.896 | 9.002 | 7321. | .9623 | .9827 | .9707 | 29.00 | .2699 | .001359 |
| 1.938 | 9.207 | 7488. | .9660 | .9844 | .9736 | 29.09 | .2460 | .001397 |
| 1.973 | 9.374 | 7626. | .9679 | .9852 | .9751 | 29.14 | .2265 | .001427 |
| 2.006 | 9.532 | 7753. | .9726 | .9874 | .9788 | 29.26 | .2084 | .001455 |
| 2.034 | 9.665 | 7861. | .9741 | .9880 | .9800 | 29.30 | .1938 | .001478 |
| 2.070 | 9.834 | 7999. | .9769 | .9893 | .9822 | 29.37 | .1752 | .001507 |
| 2.099 | 9.967 | 8106. | .9785 | .9900 | .9834 | 29.41 | .1608 | .001529 |
| 2.131 | 10.124 | 8234. | .9820 | .9916 | .9861 | 29.50 | .1442 | .001555 |
| 2.159 | 10.257 | 8342. | .9834 | .9923 | .9872 | 29.54 | .1304 | .001576 |
| 2.199 | 10.450 | 8499. | .9859 | .9934 | .9891 | 29.60 | .1110 | .001605 |
| 2.236 | 10.625 | 8641. | .9870 | .9939 | .9900 | 29.63 | .0937 | .001632 |
| 2.270 | 10.787 | 8774. | .9896 | .9951 | .9920 | 29.69 | .0786 | .001655 |
| 2.308 | 10.968 | 8921. | .9902 | .9954 | .9925 | 29.71 | .0620 | .001680 |
| 2.341 | 11.125 | 9049. | .9922 | .9963 | .9940 | 29.76 | .0486 | .001700 |
| 2.375 | 11.330 | 9216. | .9932 | .9968 | .9947 | 29.78 | .0317 | .001726 |
| 2.428 | 11.536 | 9382. | .9943 | .9973 | .9957 | 29.81 | .0158 | .001749 |
| 2.479 | 11.686 | 9505. | .9957 | .9980 | .9967 | 29.85 | .0049 | .001766 |
| 2.491 | 11.837 | 9628. | .9957 | .9980 | .9967 | 29.95 | 0.0000 | .001773 |
| 2.515 | 11.952 | 9721. | .9967 | .9985 | .9975 | 29.87 | 0.0000 | .001773 |
| 2.540 | 12.308 | 10011. | .9978 | .9990 | .9983 | 29.90 | 0.0000 | .001773 |
| 2.661 | 12.644 | 10285. | .9987 | .9994 | .9990 | 29.92 | 0.0000 | .001773 |
| 2.740 | 13.020 | 10590. | .9991 | .9995 | .9993 | 29.93 | 0.0000 | .001773 |
| 2.807 | 13.340 | 10850. | .9991 | .9996 | .9993 | 29.93 | 0.0000 | .001773 |
| 2.871 | 13.641 | 11095. | .9997 | .9998 | .9997 | 29.95 | 0.0000 | .001773 |
| 2.948 | 14.009 | 11394. | .9996 | .9998 | .9997 | 29.95 | 0.0000 | .001773 |
| 3.012 | 14.311 | 11640. | .9999 | .9999 | .9999 | 29.95 | 0.0000 | .001773 |
| 3.098 | 14.771 | 11974. | .9995 | .9998 | .9996 | 29.94 | 0.0000 | .001773 |
| 3.180 | 15.107 | 12288. | 1.0001 | 1.0000 | 1.0001 | 29.96 | 0.0000 | .001773 |
| 3.276 | 15.566 | 12661. | 1.0000 | 1.0000 | 1.0000 | 29.96 | 0.0000 | .001773 |
| 3.360 | 15.964 | 12984. | 1.0000 | 1.0000 | 1.0000 | 29.96 | 0.0000 | .001773 |
| 3.439 | 16.338 | 13289. | .9998 | .9999 | .9998 | 29.95 | 0.0000 | .001773 |
| 3.520 | 16.724 | 13603. | 1.0000 | 1.0000 | 1.0000 | 29.96 | 0.0000 | .001773 |

TABLE A12. (CONT.)
 PROFILE - JPL-5 - - - PITOT PRESSURE DATA

EDGE MACH NO.= 1.3130 TOTAL PRESSURE= .1330E+06 N/M**2
 X= 7.62 CM TOTAL TEMPRATURF= 319.81 DEG-K

UE= 406.36 M/SEC DELTA STAR= .4242 CM THETA= .2189 CM H= 1.937
 RE-DELTA-STAR= 77910. RE-THETA= 40210. NUWALL= .3649 CM**2/SEC

LEAST SQUARE FIT PARAMETERS
 UTAH= 14.0527 M/SEC CF= .001832 PI= .5630 DELTA= 2.5667 CM
 CHISQR= .7885E-05 YMAX= 2.439 CM YMIN= .043 CM

| Y (CM) | Y/THETA | Y-PLUS | M/ME | RHO/RHOE | U/UE | U-PLUS | TAU/TAU-MAX | V/U |
|--------|---------|--------|--------|----------|--------|--------|-------------|----------|
| 0.000 | 0.000 | 0. | 0.0000 | .7661 | 0.0000 | 0.00 | 1.0000 | 0.000000 |
| .010 | .046 | 38. | .4244 | .8083 | .4721 | 13.77 | 1.0000 | 0.000000 |
| .022 | .104 | 87. | .4553 | .8146 | .5044 | 14.73 | .9989 | .000005 |
| .031 | .144 | 122. | .5179 | .8289 | .5689 | 16.66 | .9981 | .000003 |
| .043 | .196 | 165. | .5501 | .8369 | .6013 | 17.64 | .9970 | .000017 |
| .054 | .249 | 210. | .5683 | .8417 | .6194 | 18.19 | .9957 | .000017 |
| .091 | .370 | 312. | .5988 | .8500 | .6494 | 19.10 | .9926 | .000027 |
| .092 | .473 | 356. | .6108 | .8534 | .6612 | 19.46 | .9911 | .000032 |
| .109 | .498 | 420. | .6224 | .8567 | .6724 | 19.80 | .9890 | .000038 |
| .119 | .544 | 459. | .6383 | .8614 | .6877 | 20.27 | .9876 | .000047 |
| .144 | .660 | 557. | .6484 | .8645 | .6974 | 20.57 | .9840 | .000052 |
| .157 | .718 | 606. | .6568 | .8670 | .7054 | 20.81 | .9821 | .000058 |
| .173 | .794 | 669. | .6654 | .8697 | .7135 | 21.06 | .9796 | .000064 |
| .194 | .897 | 748. | .6711 | .8715 | .7188 | 21.23 | .9764 | .000073 |
| .214 | .980 | 826. | .6814 | .8747 | .7286 | 21.53 | .9731 | .000081 |
| .238 | 1.090 | 919. | .6870 | .8765 | .7338 | 21.69 | .9691 | .000091 |
| .260 | 1.189 | 1002. | .7001 | .8808 | .7460 | 22.06 | .9653 | .000101 |
| .289 | 1.322 | 1114. | .7062 | .8828 | .7516 | 22.74 | .9600 | .000114 |
| .304 | 1.392 | 1173. | .7074 | .8831 | .7527 | 22.27 | .9572 | .000120 |
| .330 | 1.508 | 1271. | .7165 | .8862 | .7611 | 22.54 | .9524 | .000132 |
| .364 | 1.664 | 1403. | .7232 | .8884 | .7672 | 22.73 | .9456 | .000147 |
| .387 | 1.769 | 1491. | .7307 | .8910 | .7741 | 22.94 | .9409 | .000158 |
| .410 | 1.873 | 1579. | .7366 | .8930 | .7794 | 23.11 | .9360 | .000169 |
| .445 | 2.035 | 1716. | .7430 | .8952 | .7853 | 23.29 | .9283 | .000186 |
| .469 | 2.146 | 1809. | .7499 | .8976 | .7915 | 23.48 | .9228 | .000199 |
| .513 | 2.343 | 1975. | .7562 | .8999 | .7972 | 23.66 | .9126 | .000221 |
| .547 | 2.476 | 2088. | .7613 | .9017 | .8017 | 23.80 | .9054 | .000236 |
| .566 | 2.587 | 2181. | .7679 | .9040 | .8076 | 23.99 | .8992 | .000249 |
| .601 | 2.749 | 2317. | .7728 | .9058 | .8120 | 24.13 | .8899 | .000269 |
| .641 | 2.929 | 2469. | .7851 | .9103 | .8229 | 24.47 | .8790 | .000291 |
| .678 | 3.097 | 2611. | .7866 | .9108 | .8242 | 24.51 | .8685 | .000312 |
| .715 | 3.266 | 2753. | .7915 | .9126 | .8285 | 24.65 | .8575 | .000334 |
| .750 | 3.428 | 2890. | .7999 | .9158 | .8359 | 24.88 | .8465 | .000356 |
| .788 | 3.602 | 3037. | .8039 | .9173 | .8394 | 24.99 | .8342 | .000381 |
| .811 | 3.706 | 3175. | .8112 | .9200 | .8457 | 25.19 | .8266 | .000395 |
| .834 | 3.810 | 3212. | .8143 | .9212 | .8484 | 25.28 | .8189 | .000410 |
| .875 | 3.996 | 3369. | .8201 | .9234 | .8534 | 25.43 | .8046 | .000438 |
| .905 | 4.136 | 3487. | .8260 | .9257 | .8585 | 25.60 | .7936 | .000459 |
| .930 | 4.252 | 3585. | .8296 | .9271 | .8616 | 25.70 | .7841 | .000477 |
| .951 | 4.344 | 3663. | .8315 | .9278 | .8632 | 25.75 | .7764 | .000491 |
| .996 | 4.553 | 3839. | .8411 | .9316 | .8715 | 26.01 | .7586 | .000524 |

| Y (CM) | Y/THETA | Y-PLUS | TABLE A12. (CONT.) | | U/U | U-PLUS | TAU/TAU-MAX | V/U |
|--------|---------|--------|--------------------|----------|--------|--------|-------------|---------|
| | | | N/ME | RHO/RHOE | | | | |
| 1.073 | 4.698 | 3961. | .8440 | .9327 | .8739 | 26.09 | .7458 | .000548 |
| 1.062 | 4.855 | 4093. | .8509 | .9354 | .8797 | 26.27 | .7316 | .000574 |
| 1.131 | 5.168 | 4357. | .8587 | .9386 | .8863 | 26.48 | .7021 | .000627 |
| 1.149 | 5.342 | 4504. | .8658 | .9414 | .8923 | 26.68 | .6850 | .000658 |
| 1.205 | 5.505 | 4641. | .8709 | .9435 | .8966 | 26.81 | .6687 | .000686 |
| 1.228 | 5.609 | 4729. | .8744 | .9449 | .8995 | 26.91 | .6581 | .000705 |
| 1.276 | 5.829 | 4915. | .8813 | .9478 | .9053 | 27.09 | .6351 | .000745 |
| 1.304 | 5.957 | 5022. | .8847 | .9492 | .9081 | 27.18 | .6214 | .000769 |
| 1.334 | 6.096 | 5140. | .8884 | .9507 | .9111 | 27.28 | .6063 | .000795 |
| 1.377 | 6.294 | 5306. | .8932 | .9527 | .9151 | 27.41 | .5846 | .000832 |
| 1.410 | 6.444 | 5433. | .8988 | .9550 | .9197 | 27.56 | .5676 | .000861 |
| 1.450 | 6.624 | 5585. | .9025 | .9566 | .9227 | 27.65 | .5471 | .000896 |
| 1.489 | 6.804 | 5737. | .9090 | .9593 | .9280 | 27.82 | .5262 | .000931 |
| 1.532 | 7.001 | 5903. | .9147 | .9618 | .9327 | 27.98 | .5031 | .000969 |
| 1.577 | 7.204 | 6074. | .9202 | .9642 | .9371 | 28.12 | .4790 | .001009 |
| 1.609 | 7.349 | 6196. | .9225 | .9651 | .9390 | 28.18 | .4616 | .001037 |
| 1.657 | 7.570 | 6382. | .9288 | .9678 | .9440 | 28.35 | .4349 | .001081 |
| 1.695 | 7.744 | 6529. | .9339 | .9701 | .9482 | 28.48 | .4138 | .001115 |
| 1.725 | 7.883 | 6646. | .9381 | .9719 | .9515 | 28.59 | .3968 | .001142 |
| 1.776 | 8.115 | 6842. | .9421 | .9737 | .9547 | 28.69 | .3683 | .001188 |
| 1.814 | 8.289 | 6989. | .9468 | .9757 | .9585 | 28.81 | .3472 | .001221 |
| 1.851 | 8.457 | 7130. | .9517 | .9779 | .9623 | 28.94 | .3267 | .001254 |
| 1.896 | 8.661 | 7302. | .9548 | .9793 | .9648 | 29.02 | .3021 | .001292 |
| 1.941 | 8.869 | 7478. | .9603 | .9818 | .9692 | 29.16 | .2770 | .001331 |
| 1.974 | 9.020 | 7605. | .9635 | .9832 | .9717 | 29.25 | .2590 | .001359 |
| 2.018 | 9.217 | 7771. | .9668 | .9847 | .9743 | 29.33 | .2358 | .001395 |
| 2.056 | 9.392 | 7918. | .9699 | .9861 | .9767 | 29.41 | .2157 | .001426 |
| 2.091 | 9.554 | 8055. | .9731 | .9875 | .9791 | 29.49 | .1972 | .001455 |
| 2.127 | 9.716 | 8192. | .9750 | .9884 | .9807 | 29.54 | .1790 | .001482 |
| 2.162 | 9.879 | 8329. | .9783 | .9900 | .9833 | 29.63 | .1608 | .001510 |
| 2.186 | 9.989 | 8472. | .9801 | .9908 | .9847 | 29.67 | .1493 | .001528 |
| 2.223 | 10.157 | 8563. | .9825 | .9919 | .9865 | 29.73 | .1314 | .001555 |
| 2.259 | 10.320 | 8700. | .9844 | .9927 | .9879 | 29.78 | .1149 | .001579 |
| 2.293 | 10.476 | 8832. | .9860 | .9935 | .9892 | 29.82 | .0993 | .001603 |
| 2.327 | 10.633 | 8965. | .9884 | .9946 | .9910 | 29.88 | .0843 | .001625 |
| 2.366 | 10.807 | 9111. | .9897 | .9952 | .9921 | 29.92 | .0681 | .001649 |
| 2.400 | 10.964 | 9243. | .9907 | .9956 | .9928 | 29.94 | .0542 | .001670 |
| 2.439 | 11.143 | 9395. | .9916 | .9961 | .9936 | 29.97 | .0391 | .001693 |
| 2.462 | 11.248 | 9483. | .9932 | .9968 | .9947 | 30.01 | .0306 | .001705 |
| 2.496 | 11.405 | 9615. | .9943 | .9973 | .9956 | 30.03 | .0184 | .001723 |
| 2.537 | 11.590 | 9771. | .9947 | .9975 | .9959 | 30.04 | .0050 | .001743 |
| 2.571 | 11.747 | 9903. | .9959 | .9981 | .9969 | 30.08 | 0.0000 | .001751 |
| 2.602 | 11.886 | 10021. | .9973 | .9987 | .9979 | 30.11 | 0.0000 | .001751 |
| 2.673 | 12.211 | 10295. | .9979 | .9990 | .9984 | 30.13 | 0.0000 | .001751 |
| 2.747 | 12.547 | 10579. | .9986 | .9993 | .9989 | 30.14 | 0.0000 | .001751 |
| 2.824 | 12.901 | 10877. | .9990 | .9995 | .9992 | 30.15 | 0.0000 | .001751 |
| 2.912 | 13.302 | 11214. | .9995 | .9997 | .9996 | 30.17 | 0.0000 | .001751 |
| 2.989 | 13.655 | 11512. | 1.0004 | 1.0007 | 1.0003 | 30.19 | 0.0000 | .001751 |
| 3.074 | 14.044 | 11840. | 1.0004 | 1.0002 | 1.0003 | 30.19 | 0.0000 | .001751 |
| 3.148 | 14.381 | 12124. | 1.0001 | 1.0000 | 1.0001 | 30.18 | 0.0000 | .001751 |
| 3.230 | 14.757 | 12447. | .9998 | .9999 | .9998 | 30.17 | 0.0000 | .001751 |
| 3.318 | 15.158 | 12779. | .9998 | .9999 | .9998 | 30.17 | 0.0000 | .001751 |
| 3.344 | 15.459 | 13034. | 1.0000 | 1.0000 | 1.0000 | 30.18 | 0.0000 | .001751 |
| 3.477 | 15.883 | 13391. | .9998 | .9999 | .9998 | 30.17 | 0.0000 | .001751 |
| 3.567 | 16.295 | 13738. | .9997 | .9999 | .9998 | 30.17 | 0.0000 | .001751 |
| 3.641 | 16.631 | 14071. | .9997 | .9998 | .9998 | 30.17 | 0.0000 | .001751 |

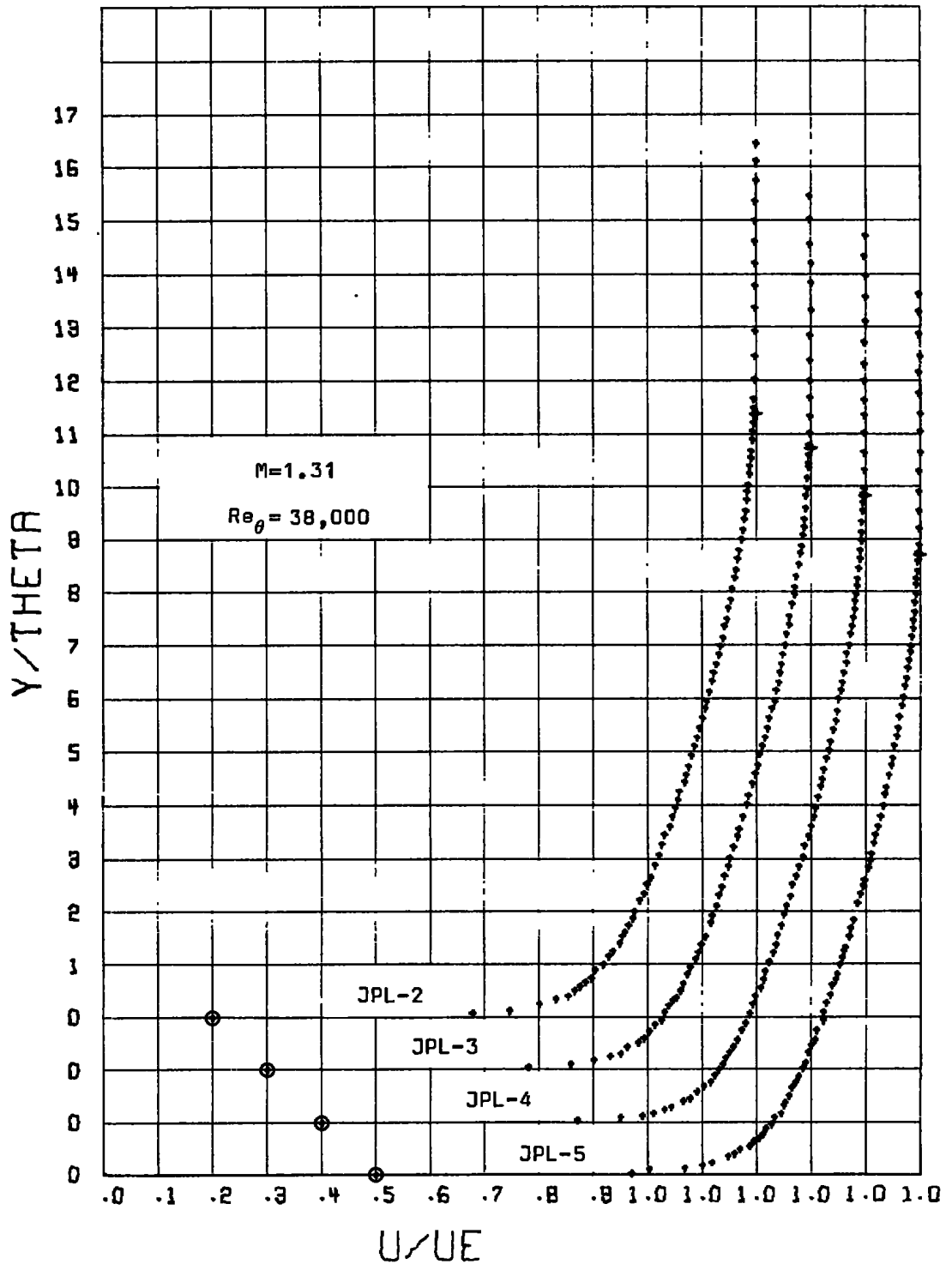


Figure A33. Mean Velocity Profiles.

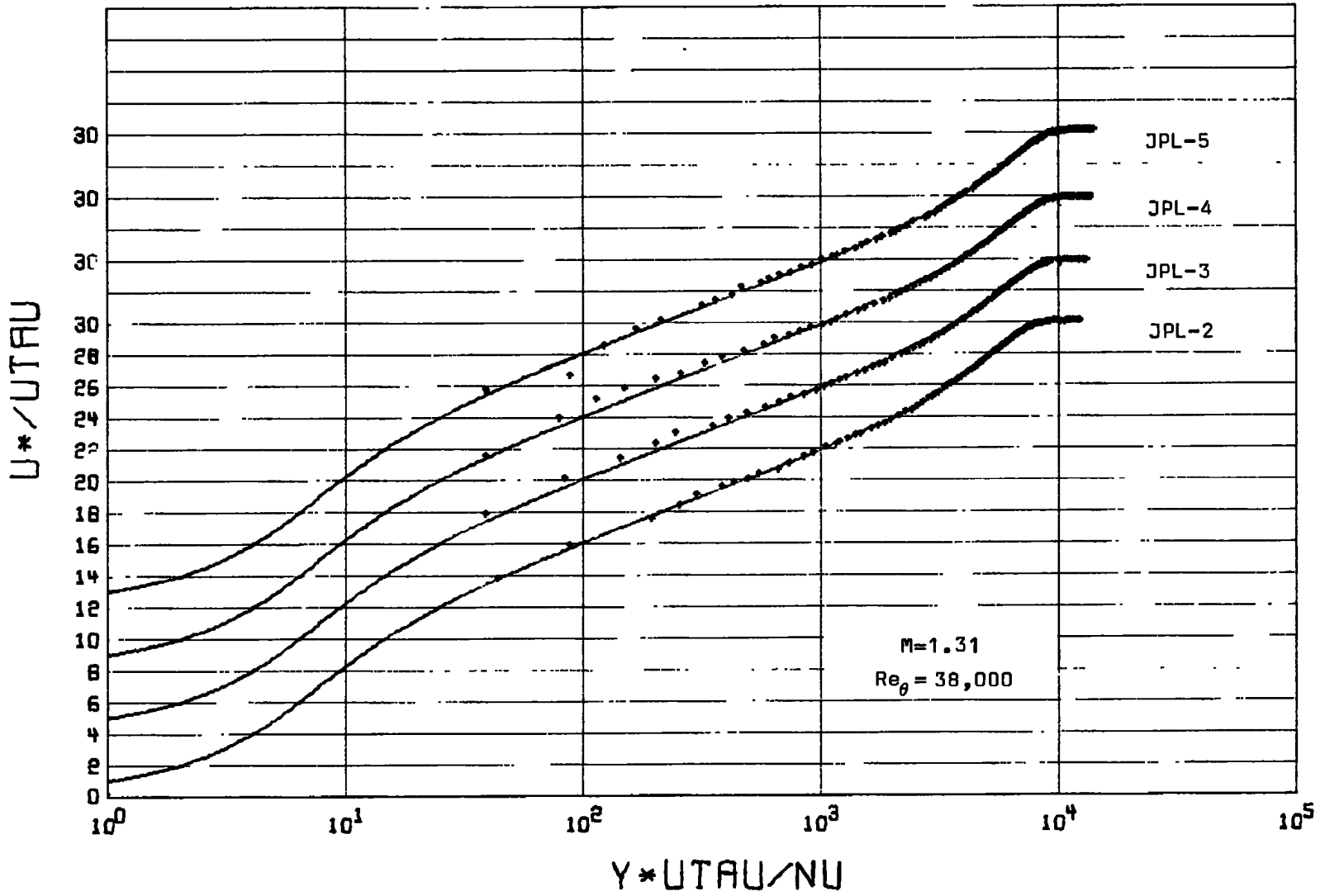


Figure A34. Van Driest Scaled Mean Velocity Profiles.

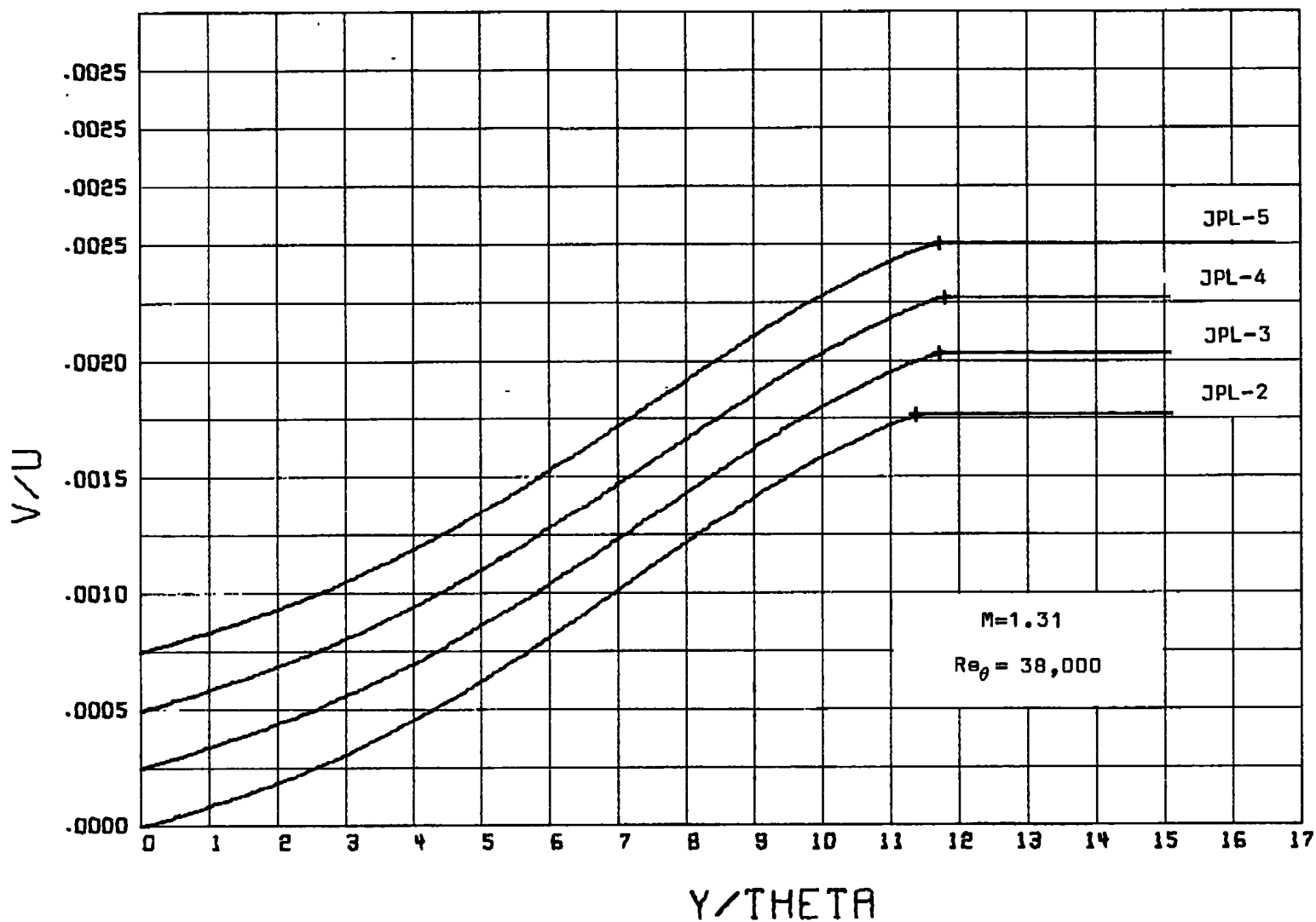


Figure A35. Normal Velocity Distribution.

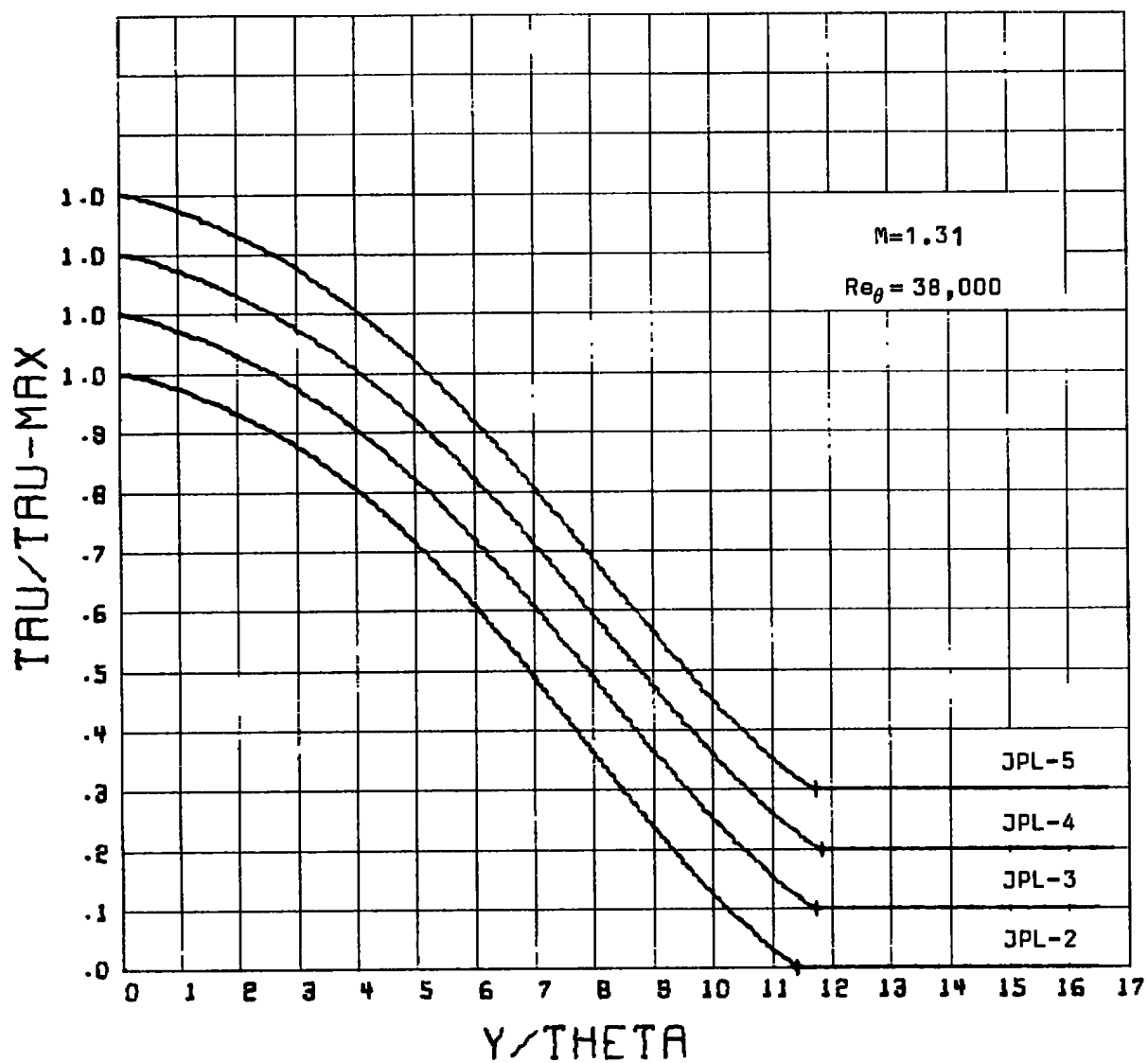


Figure A36. Shear Stress Distribution.

TABLE A13. DATA SUMMARY
PROFILE - JPL-2 - - - PITOT PRESSURE DATA

EDGE MACH NO.= 2.1722
X=-76.21 CM

TOTAL PRESSURE= .9331E+05 N/M**2
TOTAL TEMPERATURE= 308.65 DEG-K

UE= 549.35 M/SEC
RE-DELTA-STAR= 77210.

DELTA STAR=.7410 CM
RE-THETA= 23070.

THETA= .2368 CM
MUWALL= 1.7380 CM**2/SEC

H= 3.129

LEAST SQUARE FIT PARAMETERS
UIAU= 21.4185 M/SEC
CHISOR= .7262E-05

CF= .001656
YMAX= 2.998 CM

PI= .6109
YMIN= .151 CM

DELTA= 3.1706 CM

| Y (CM) | Y/THETA | Y-PLUS | M/ME | RHO/RHOE | U/UE | U-PLUS | TAU/TAU-MAX | V/U |
|--------|---------|--------|--------|----------|--------|--------|-------------|----------|
| 0.000 | 0.000 | 0. | 0.0000 | .5449 | 0.0000 | 0.00 | 1.0000 | 0.000000 |
| .010 | .042 | 12. | .2908 | .5834 | .3808 | 9.87 | 1.0000 | 0.000000 |
| .013 | .058 | 17. | .3564 | .6027 | .4591 | 11.97 | .9998 | .000101 |
| .027 | .117 | 34. | .4178 | .6743 | .5787 | 13.86 | .9991 | .000006 |
| .044 | .187 | 54. | .4583 | .6405 | .5777 | 15.08 | .9987 | .000017 |
| .052 | .219 | 64. | .4809 | .6501 | .5965 | 15.74 | .9977 | .000015 |
| .071 | .300 | 87. | .4977 | .6574 | .6132 | 16.21 | .9963 | .000027 |
| .087 | .348 | 101. | .5095 | .6630 | .6257 | 16.56 | .9954 | .000027 |
| .090 | .390 | 111. | .5167 | .6664 | .6330 | 16.77 | .9948 | .000129 |
| .096 | .407 | 118. | .5252 | .6704 | .6415 | 17.01 | .9943 | .000032 |
| .113 | .477 | 139. | .5361 | .6757 | .6577 | 17.37 | .9929 | .000038 |
| .129 | .547 | 159. | .5418 | .6785 | .6578 | 17.48 | .9914 | .000045 |
| .140 | .595 | 173. | .5491 | .6821 | .6649 | 17.68 | .9903 | .000149 |
| .151 | .638 | 186. | .5591 | .6871 | .6744 | 17.96 | .9893 | .000053 |
| .170 | .718 | 209. | .5688 | .6921 | .6837 | 18.27 | .9874 | .000061 |
| .187 | .793 | 231. | .5744 | .6950 | .6890 | 18.37 | .9856 | .000068 |
| .201 | .852 | 248. | .5854 | .7008 | .6997 | 18.67 | .9841 | .000074 |
| .212 | .895 | 261. | .5904 | .7035 | .7039 | 18.81 | .9830 | .000079 |
| .240 | 1.013 | 295. | .5992 | .7083 | .7120 | 19.04 | .9798 | .000090 |
| .265 | 1.120 | 327. | .6091 | .7137 | .7209 | 19.31 | .9769 | .000101 |
| .295 | 1.249 | 364. | .6163 | .7177 | .7275 | 19.50 | .9732 | .000115 |
| .326 | 1.378 | 402. | .6235 | .7218 | .7339 | 19.69 | .9693 | .000129 |
| .355 | 1.501 | 438. | .6311 | .7262 | .7406 | 19.89 | .9654 | .000142 |
| .382 | 1.614 | 471. | .6416 | .7322 | .7498 | 20.16 | .9618 | .000155 |
| .427 | 1.785 | 521. | .6507 | .7376 | .7576 | 20.39 | .9560 | .000174 |
| .448 | 1.893 | 552. | .6540 | .7396 | .7605 | 20.48 | .9522 | .000187 |
| .499 | 2.107 | 615. | .6657 | .7466 | .7705 | 20.78 | .9443 | .000217 |
| .524 | 2.214 | 646. | .6709 | .7497 | .7748 | 20.91 | .9402 | .000226 |
| .547 | 2.311 | 674. | .6750 | .7527 | .7783 | 21.01 | .9364 | .000238 |
| .589 | 2.488 | 776. | .6847 | .7582 | .7863 | 21.25 | .9297 | .000261 |
| .628 | 2.654 | 774. | .6916 | .7625 | .7920 | 21.43 | .9221 | .000263 |
| .678 | 2.863 | 835. | .7002 | .7680 | .7990 | 21.64 | .9128 | .000312 |
| .719 | 3.035 | 885. | .7087 | .7735 | .8059 | 21.85 | .9047 | .000336 |
| .779 | 3.292 | 960. | .7189 | .7801 | .8140 | 22.10 | .8920 | .000374 |
| .861 | 3.636 | 1061. | .7319 | .7887 | .8241 | 22.41 | .8739 | .000428 |
| .900 | 3.807 | 1109. | .7375 | .7924 | .8285 | 22.54 | .8645 | .000455 |
| .946 | 3.995 | 1166. | .7485 | .7999 | .8369 | 22.81 | .8533 | .000467 |
| .940 | 4.140 | 1208. | .7525 | .8026 | .8400 | 22.90 | .8445 | .000512 |
| 1.014 | 4.285 | 1250. | .7559 | .8049 | .8425 | 22.98 | .8355 | .000537 |
| 1.056 | 4.442 | 1302. | .7671 | .8127 | .8509 | 23.24 | .8241 | .000569 |
| 1.101 | 4.649 | 1356. | .7706 | .8151 | .8535 | 23.32 | .8115 | .000604 |

| Y (CM) | Y/THETA | Y-PLUS | TABLE A13. (CONT.) M/ME | RHO/RHOF | U/UE | U-PLUS | TAU/TAU-MAX | V/U |
|--------|---------|--------|----------------------------|----------|--------|--------|-------------|---------|
| 1.131 | 4.778 | 1394. | .7778 | .8202 | .8588 | 23.49 | .8027 | .000629 |
| 1.172 | 4.950 | 1444. | .7813 | .8227 | .8614 | 23.57 | .7906 | .000662 |
| 1.220 | 5.154 | 1504. | .7905 | .8293 | .8681 | 23.78 | .7756 | .000702 |
| 1.254 | 5.314 | 1551. | .7955 | .8329 | .8717 | 23.90 | .7635 | .000735 |
| 1.306 | 5.518 | 1610. | .8009 | .8368 | .8755 | 24.02 | .7476 | .000778 |
| 1.341 | 5.663 | 1652. | .8070 | .8413 | .8799 | 24.16 | .7360 | .000908 |
| 1.373 | 5.847 | 1704. | .8119 | .8449 | .8833 | 24.27 | .7215 | .000847 |
| 1.416 | 5.979 | 1745. | .8199 | .8508 | .8888 | 24.44 | .7097 | .000878 |
| 1.459 | 6.162 | 1798. | .8254 | .8549 | .8927 | 24.57 | .6940 | .000919 |
| 1.489 | 6.291 | 1835. | .8304 | .8587 | .8961 | 24.68 | .6826 | .000948 |
| 1.532 | 6.473 | 1889. | .8367 | .8635 | .9004 | 24.81 | .6664 | .000990 |
| 1.573 | 6.644 | 1939. | .8418 | .8674 | .9039 | 24.93 | .6506 | .001030 |
| 1.612 | 6.811 | 1987. | .8469 | .8713 | .9073 | 25.04 | .6349 | .001070 |
| 1.659 | 7.009 | 2045. | .8528 | .8759 | .9112 | 25.17 | .6162 | .001118 |
| 1.697 | 7.170 | 2092. | .8609 | .8822 | .9165 | 25.34 | .6005 | .001157 |
| 1.729 | 7.304 | 2131. | .8642 | .8848 | .9187 | 25.41 | .5873 | .001190 |
| 1.779 | 7.513 | 2192. | .8707 | .8895 | .9227 | 25.54 | .5664 | .001242 |
| 1.865 | 7.878 | 2299. | .8820 | .8990 | .9303 | 25.79 | .5291 | .001334 |
| 1.911 | 8.071 | 2355. | .8878 | .9036 | .9340 | 25.91 | .5090 | .001383 |
| 1.958 | 8.270 | 2413. | .8925 | .9074 | .9369 | 26.01 | .4891 | .001434 |
| 1.996 | 8.430 | 2460. | .8973 | .9113 | .9399 | 26.11 | .4710 | .001475 |
| 2.078 | 8.564 | 2499. | .9016 | .9148 | .9426 | 26.20 | .4567 | .001509 |
| 2.113 | 8.974 | 2604. | .9127 | .9236 | .9492 | 26.42 | .4177 | .001603 |
| 2.160 | 9.122 | 2662. | .9183 | .9287 | .9529 | 26.54 | .3965 | .001653 |
| 2.213 | 9.349 | 2727. | .9238 | .9337 | .9562 | 26.65 | .3721 | .001710 |
| 2.240 | 9.460 | 2760. | .9269 | .9359 | .9581 | 26.72 | .3599 | .001739 |
| 2.286 | 9.653 | 2817. | .9319 | .9401 | .9611 | 26.82 | .3390 | .001788 |
| 2.332 | 9.852 | 2875. | .9375 | .9448 | .9644 | 26.93 | .3177 | .001838 |
| 2.371 | 10.013 | 2927. | .9434 | .9499 | .9679 | 27.05 | .3004 | .001878 |
| 2.449 | 10.345 | 3019. | .9495 | .9552 | .9715 | 27.17 | .2652 | .001959 |
| 2.493 | 10.527 | 3072. | .9540 | .9591 | .9741 | 27.26 | .2462 | .002003 |
| 2.532 | 10.694 | 3120. | .9577 | .9623 | .9763 | 27.33 | .2290 | .002042 |
| 2.594 | 10.956 | 3197. | .9626 | .9666 | .9791 | 27.43 | .2024 | .002103 |
| 2.616 | 11.048 | 3224. | .9665 | .9700 | .9813 | 27.50 | .1929 | .002125 |
| 2.659 | 11.230 | 3277. | .9700 | .9731 | .9833 | 27.57 | .1755 | .002164 |
| 2.702 | 11.412 | 3330. | .9728 | .9756 | .9849 | 27.63 | .1580 | .002204 |
| 2.747 | 11.600 | 3385. | .9763 | .9787 | .9868 | 27.69 | .1404 | .002244 |
| 2.790 | 11.739 | 3426. | .9792 | .9813 | .9885 | 27.75 | .1277 | .002272 |
| 2.848 | 12.072 | 3523. | .9833 | .9849 | .9908 | 27.83 | .0987 | .002337 |
| 2.839 | 12.201 | 3560. | .9851 | .9865 | .9918 | 27.86 | .0879 | .002362 |
| 2.947 | 12.405 | 3620. | .9873 | .9885 | .9930 | 27.90 | .0712 | .002399 |
| 2.970 | 12.544 | 3660. | .9898 | .9908 | .9944 | 27.95 | .0606 | .002422 |
| 2.998 | 12.662 | 3695. | .9900 | .9909 | .9945 | 27.96 | .0518 | .002442 |
| 3.039 | 12.834 | 3745. | .9923 | .9931 | .9958 | 28.00 | .0395 | .002470 |
| 3.092 | 13.016 | 3798. | .9936 | .9942 | .9965 | 28.03 | .0271 | .002497 |
| 3.121 | 13.182 | 3847. | .9941 | .9946 | .9967 | 28.03 | .0164 | .002521 |
| 3.161 | 13.348 | 3895. | .9959 | .9963 | .9978 | 28.07 | .0062 | .002543 |
| 3.201 | 13.520 | 3945. | .9967 | .9970 | .9982 | 28.08 | 0.0000 | .002557 |
| 3.242 | 13.692 | 3994. | .9970 | .9973 | .9984 | 28.09 | 0.0000 | .002557 |
| 3.309 | 13.971 | 4077. | .9977 | .9979 | .9987 | 28.10 | 0.0000 | .002557 |
| 3.390 | 14.319 | 4178. | .9986 | .9987 | .9992 | 28.12 | 0.0000 | .002557 |
| 3.487 | 14.705 | 4291. | .9994 | .9994 | .9996 | 28.14 | 0.0000 | .002557 |
| 3.558 | 15.027 | 4385. | .9995 | .9996 | .9997 | 28.14 | 0.0000 | .002557 |
| 3.595 | 15.183 | 4430. | 1.0001 | 1.0001 | 1.0000 | 28.15 | 0.0000 | .002557 |
| 3.625 | 15.311 | 4468. | 1.0003 | 1.0002 | 1.0001 | 28.15 | 0.0000 | .002557 |
| 3.646 | 15.440 | 4505. | .9999 | .9999 | .9999 | 28.15 | 0.0000 | .002557 |

TABLE A13. (CONT.)
PROFILE - JPL-3 - - - PITOT PRESSURE DATA

EDGE MACH NO.= 2.1666 TOTAL PRESSURE= .9331E+05 N/M**2
X= -7.62 CM TOTAL TEMPERATURE= 311.07 DEG-K

UE= 550.76 M/SEC DELTA STAR= .7595 CM THETA= .2435 CM H= 3.119
RE-DELTA-STAR= 73380. RE-THETA= 73520. NUWALL= 1.7470 CM**2/SEC

LEAST SQUARE FIT PARAMETERS
UTAW= 21.4045 M/SEC CF= .001649 PI= .6175 DELTA= 3.2535 CM
CHISQR= .4343E-05 YMAX= 3.073 CM YMIN= .147 CM

| Y (CM) | Y/THETA | Y-PLUS | M/ME | RHO/RHO* | U/UE | U-PLUS | TAU/TAU-MAX | V/U |
|--------|---------|--------|--------|----------|--------|--------|-------------|----------|
| 0.000 | 0.000 | 0. | 0.0000 | .5461 | 0.0000 | 0.00 | 1.0000 | 0.000000 |
| .010 | .041 | 12. | .3137 | .5908 | .4081 | 10.64 | 1.0000 | 0.000000 |
| .015 | .062 | 18. | .3605 | .6078 | .4727 | 12.38 | .9998 | .000002 |
| .027 | .114 | 34. | .4194 | .6260 | .5301 | 13.94 | .9992 | .000006 |
| .040 | .166 | 49. | .4500 | .6380 | .5633 | 14.86 | .9985 | .000011 |
| .053 | .239 | 71. | .4805 | .6509 | .5955 | 15.76 | .9973 | .000017 |
| .086 | .354 | 105. | .5079 | .6632 | .6237 | 16.56 | .9953 | .000027 |
| .096 | .396 | 118. | .5188 | .6683 | .6346 | 16.87 | .9945 | .000031 |
| .119 | .490 | 146. | .5365 | .6768 | .6521 | 17.37 | .9925 | .000039 |
| .140 | .578 | 172. | .5474 | .6821 | .6629 | 17.67 | .9906 | .000048 |
| .147 | .604 | 180. | .5544 | .6856 | .6695 | 17.87 | .9900 | .000050 |
| .171 | .704 | 210. | .5637 | .6904 | .6785 | 18.13 | .9877 | .000060 |
| .189 | .777 | 231. | .5756 | .6965 | .6897 | 18.45 | .9859 | .000067 |
| .213 | .897 | 267. | .5847 | .7013 | .6982 | 18.70 | .9829 | .000079 |
| .238 | .980 | 292. | .5951 | .7069 | .7078 | 18.98 | .9807 | .000087 |
| .265 | 1.089 | 325. | .6060 | .7128 | .7177 | 19.27 | .9776 | .000098 |
| .293 | 1.204 | 359. | .6130 | .7167 | .7241 | 19.46 | .9744 | .000110 |
| .340 | 1.397 | 417. | .6290 | .7257 | .7384 | 19.88 | .9686 | .000130 |
| .384 | 1.580 | 471. | .6369 | .7302 | .7453 | 20.09 | .9627 | .000150 |
| .420 | 1.726 | 515. | .6492 | .7374 | .7560 | 20.41 | .9578 | .000167 |
| .454 | 1.872 | 558. | .6567 | .7419 | .7625 | 20.60 | .9527 | .000184 |
| .496 | 2.039 | 608. | .6623 | .7452 | .7672 | 20.74 | .9467 | .000204 |
| .528 | 2.169 | 647. | .6716 | .7509 | .7751 | 20.98 | .9417 | .000220 |
| .571 | 2.346 | 700. | .6765 | .7534 | .7791 | 21.10 | .9347 | .000242 |
| .608 | 2.498 | 745. | .6856 | .7595 | .7867 | 21.33 | .9284 | .000261 |
| .654 | 2.685 | 801. | .6930 | .7641 | .7928 | 21.52 | .9203 | .000287 |
| .698 | 2.826 | 843. | .7027 | .7702 | .8006 | 21.76 | .9140 | .000306 |
| .739 | 3.035 | 905. | .7112 | .7757 | .8075 | 21.96 | .9047 | .000336 |
| .773 | 3.176 | 947. | .7158 | .7787 | .8111 | 22.08 | .8973 | .000356 |
| .819 | 3.363 | 1003. | .7249 | .7846 | .8183 | 22.30 | .8877 | .000384 |
| .876 | 3.598 | 1073. | .7308 | .7886 | .8230 | 22.44 | .8757 | .000421 |
| .914 | 3.754 | 1120. | .7375 | .7930 | .8282 | 22.60 | .8664 | .000446 |
| .947 | 3.973 | 1185. | .7451 | .7981 | .8340 | 22.78 | .8537 | .000483 |
| 1.005 | 4.130 | 1232. | .7538 | .8040 | .8406 | 22.99 | .8442 | .000510 |
| 1.041 | 4.276 | 1275. | .7562 | .8057 | .8424 | 23.05 | .8350 | .000536 |
| 1.102 | 4.526 | 1350. | .7671 | .8132 | .8506 | 23.30 | .8186 | .000581 |
| 1.135 | 4.667 | 1391. | .7725 | .8170 | .8546 | 23.43 | .8094 | .000606 |
| 1.170 | 4.808 | 1434. | .7769 | .8201 | .8579 | 23.53 | .7993 | .000634 |
| 1.215 | 4.990 | 1480. | .7852 | .8260 | .8640 | 23.73 | .7861 | .000670 |
| 1.267 | 5.204 | 1552. | .7935 | .8319 | .8699 | 23.91 | .7702 | .000713 |
| 1.314 | 5.397 | 1610. | .8005 | .8370 | .8750 | 24.07 | .7553 | .000753 |

| Y (CM) | Y/THETA | Y-PLUS | TABLE A13. (CONT.) M/ME | RHO/RHOE | U/UE | U-PLUS | TAU/TAU-MAX | V/U |
|--------|---------|--------|----------------------------|----------|--------|--------|-------------|---------|
| 1.375 | 5.648 | 1685. | .8068 | .8416 | .8795 | 24.22 | .7352 | .000806 |
| 1.417 | 5.820 | 1736. | .8150 | .8476 | .8852 | 24.40 | .7210 | .000843 |
| 1.463 | 6.007 | 1797. | .8205 | .8517 | .8891 | 24.52 | .7051 | .000884 |
| 1.510 | 6.200 | 1850. | .8275 | .8570 | .8939 | 24.68 | .6887 | .000928 |
| 1.546 | 6.352 | 1895. | .8337 | .8612 | .8978 | 24.91 | .6747 | .000963 |
| 1.595 | 6.550 | 1954. | .8379 | .8648 | .9010 | 24.91 | .6566 | .001009 |
| 1.645 | 6.758 | 2016. | .8450 | .8702 | .9058 | 25.07 | .6371 | .001058 |
| 1.676 | 6.884 | 2053. | .8500 | .8741 | .9092 | 25.18 | .6257 | .001088 |
| 1.723 | 7.076 | 2111. | .8568 | .8793 | .9137 | 25.32 | .6064 | .001135 |
| 1.771 | 7.275 | 2170. | .8606 | .8823 | .9162 | 25.40 | .5868 | .001184 |
| 1.804 | 7.410 | 2211. | .8661 | .8866 | .9198 | 25.52 | .5732 | .001218 |
| 1.859 | 7.635 | 2278. | .8730 | .8920 | .9243 | 25.67 | .5504 | .001274 |
| 1.899 | 7.801 | 2327. | .8784 | .8963 | .9278 | 25.78 | .5331 | .001316 |
| 1.939 | 7.958 | 2374. | .8818 | .8990 | .9299 | 25.86 | .5168 | .001356 |
| 1.986 | 8.156 | 2433. | .8886 | .9045 | .9343 | 26.00 | .4954 | .001407 |
| 2.034 | 8.354 | 2492. | .8958 | .9103 | .9388 | 26.15 | .4747 | .001457 |
| 2.070 | 8.500 | 2536. | .9007 | .9139 | .9416 | 26.24 | .4589 | .001495 |
| 2.113 | 8.678 | 2589. | .9067 | .9193 | .9457 | 26.38 | .4395 | .001541 |
| 2.164 | 8.886 | 2651. | .9098 | .9218 | .9476 | 26.44 | .4171 | .001594 |
| 2.202 | 9.043 | 2698. | .9164 | .9273 | .9516 | 26.58 | .4000 | .001635 |
| 2.240 | 9.283 | 2769. | .9236 | .9333 | .9560 | 26.72 | .3738 | .001696 |
| 2.302 | 9.455 | 2821. | .9279 | .9369 | .9586 | 26.81 | .3550 | .001740 |
| 2.338 | 9.601 | 2864. | .9323 | .9406 | .9612 | 26.90 | .3390 | .001777 |
| 2.404 | 9.872 | 2945. | .9392 | .9465 | .9654 | 27.04 | .3096 | .001845 |
| 2.447 | 10.049 | 2998. | .9432 | .9499 | .9677 | 27.12 | .2905 | .001889 |
| 2.494 | 10.247 | 3056. | .9487 | .9546 | .9710 | 27.23 | .2699 | .001937 |
| 2.543 | 10.446 | 3116. | .9532 | .9586 | .9736 | 27.32 | .2483 | .001986 |
| 2.583 | 10.607 | 3164. | .9589 | .9634 | .9769 | 27.43 | .2315 | .002024 |
| 2.642 | 10.852 | 3238. | .9672 | .9664 | .9788 | 27.50 | .2063 | .002081 |
| 2.698 | 11.082 | 3306. | .9661 | .9698 | .9810 | 27.57 | .1833 | .002133 |
| 2.741 | 11.259 | 3359. | .9717 | .9747 | .9842 | 27.68 | .1659 | .002173 |
| 2.788 | 11.452 | 3417. | .9748 | .9774 | .9860 | 27.74 | .1474 | .002214 |
| 2.832 | 11.629 | 3469. | .9777 | .9800 | .9876 | 27.80 | .1308 | .002251 |
| 2.840 | 11.828 | 3529. | .9816 | .9834 | .9898 | 27.88 | .1129 | .002291 |
| 2.931 | 12.036 | 3591. | .9875 | .9842 | .9903 | 27.89 | .0947 | .002332 |
| 2.964 | 12.177 | 3631. | .9860 | .9873 | .9922 | 27.96 | .0833 | .002357 |
| 3.004 | 12.339 | 3681. | .9867 | .9880 | .9926 | 27.97 | .0697 | .002387 |
| 3.048 | 12.516 | 3734. | .9884 | .9896 | .9936 | 28.01 | .0558 | .002418 |
| 3.073 | 12.670 | 3765. | .9894 | .9904 | .9942 | 28.03 | .0476 | .002436 |
| 3.125 | 12.834 | 3829. | .9919 | .9927 | .9956 | 28.07 | .0321 | .002470 |
| 3.169 | 13.017 | 3883. | .9930 | .9937 | .9962 | 28.10 | .0201 | .002497 |
| 3.200 | 13.142 | 3921. | .9936 | .9942 | .9965 | 28.11 | .0121 | .002514 |
| 3.230 | 13.267 | 3958. | .9937 | .9943 | .9965 | 28.11 | .0044 | .002531 |
| 3.266 | 13.413 | 4002. | .9942 | .9948 | .9968 | 28.12 | 0.0000 | .002541 |
| 3.304 | 13.560 | 4048. | .9962 | .9966 | .9979 | 28.16 | 0.0000 | .002541 |
| 3.342 | 13.776 | 4095. | .9971 | .9974 | .9984 | 28.17 | 0.0000 | .002541 |
| 3.401 | 13.966 | 4167. | .9973 | .9975 | .9985 | 28.18 | 0.0000 | .002541 |
| 3.437 | 14.117 | 4217. | .9984 | .9986 | .9991 | 28.20 | 0.0000 | .002541 |
| 3.470 | 14.253 | 4257. | .9988 | .9989 | .9993 | 28.21 | 0.0000 | .002541 |
| 3.516 | 14.440 | 4308. | .9995 | .9995 | .9997 | 28.22 | 0.0000 | .002541 |
| 3.554 | 14.597 | 4355. | .9991 | .9992 | .9995 | 28.21 | 0.0000 | .002541 |
| 3.599 | 14.738 | 4397. | .9999 | .9999 | .9999 | 28.23 | 0.0000 | .002541 |
| 3.627 | 14.894 | 4444. | .9998 | .9998 | .9999 | 28.22 | 0.0000 | .002541 |
| 3.665 | 15.051 | 4490. | 1.0002 | 1.0002 | 1.0001 | 28.23 | 0.0000 | .002541 |
| 3.718 | 15.270 | 4556. | 1.0008 | 1.0007 | 1.0004 | 28.24 | 0.0000 | .002541 |

TABLE A13. (CONT.)
 PROFILE - JPL-4 - - - PITOT PRESSURE DATA

EDGE MACH NO.= 2.1642 TOTAL PRESSURE= .9331E+05 N/M**2
 X= 0.00 CM TOTAL TEMPERATURE= 309.86 DEG-K

UE= 549.37 M/SEC DELTA STAR= .7967 CM THETA= .2555 CM H= 3.117
 RE-DELTA-STAR= 77000. RE-THETA= 24690. NUWALL= 1,7200 CM**2/SEC CF= .001532

LEAST SQUARE FIT PARAMETERS
 UTAU= 21.2347 M/SEC CF= .001633 PI= .6194 DELTA= 3.4195 CM
 CHISQR= .9723E-05 YMAX= 3.226 CM YMIN= .152 CM

| Y (CM) | Y/THETA | Y-PLUS | M/ME | RHO/RHOF | U/UE | U-PLUS | TAU/TAU-MAX | V/U |
|--------|---------|--------|--------|----------|--------|--------|-------------|----------|
| 0.000 | 0.000 | 0. | 0.0000 | .5467 | 0.0000 | 0.00 | 1.0000 | 0.000000 |
| .010 | .039 | 12. | .2958 | .5864 | .3864 | 10.11 | 1.0000 | 0.000000 |
| .011 | .043 | 13. | .3181 | .5926 | .4132 | 10.83 | .9999 | 0.000000 |
| .041 | .161 | 50. | .4409 | .6348 | .5534 | 14.67 | .9986 | .000010 |
| .060 | .235 | 74. | .4792 | .6508 | .5940 | 15.81 | .9975 | .000016 |
| .071 | .280 | 88. | .4955 | .6580 | .6108 | 16.28 | .9967 | .000020 |
| .090 | .354 | 111. | .5165 | .6676 | .6321 | 16.89 | .9953 | .000027 |
| .116 | .454 | 143. | .5342 | .6760 | .6497 | 17.39 | .9933 | .000036 |
| .144 | .563 | 177. | .5475 | .6826 | .6627 | 17.77 | .9910 | .000046 |
| .152 | .598 | 188. | .5587 | .6882 | .6735 | 18.08 | .9902 | .000049 |
| .170 | .667 | 210. | .5654 | .6916 | .6799 | 18.27 | .9886 | .000056 |
| .183 | .717 | 226. | .5720 | .6950 | .6861 | 18.45 | .9874 | .000060 |
| .198 | .777 | 245. | .5781 | .6987 | .6919 | 18.62 | .9859 | .000066 |
| .219 | .856 | 270. | .5874 | .7031 | .7005 | 18.87 | .9839 | .000074 |
| .249 | .975 | 307. | .5955 | .7075 | .7080 | 19.09 | .9808 | .000085 |
| .264 | 1.035 | 326. | .6026 | .7113 | .7145 | 19.28 | .9791 | .000091 |
| .285 | 1.115 | 351. | .6108 | .7158 | .7219 | 19.50 | .9769 | .000099 |
| .314 | 1.229 | 387. | .6156 | .7185 | .7263 | 19.63 | .9736 | .000111 |
| .328 | 1.284 | 405. | .6251 | .7238 | .7347 | 19.88 | .9720 | .000117 |
| .371 | 1.453 | 458. | .6303 | .7269 | .7394 | 20.02 | .9668 | .000136 |
| .409 | 1.602 | 505. | .6441 | .7348 | .7514 | 20.38 | .9619 | .000151 |
| .447 | 1.751 | 552. | .6497 | .7381 | .7563 | 20.53 | .9569 | .000168 |
| .475 | 1.860 | 587. | .6564 | .7420 | .7620 | 20.70 | .9531 | .000180 |
| .514 | 2.014 | 635. | .6639 | .7465 | .7684 | 20.89 | .9475 | .000199 |
| .546 | 2.178 | 687. | .6701 | .7503 | .7737 | 21.05 | .9412 | .000218 |
| .591 | 2.313 | 729. | .6750 | .7532 | .7777 | 21.17 | .9359 | .000235 |
| .630 | 2.466 | 778. | .6848 | .7593 | .7859 | 21.42 | .9296 | .000255 |
| .668 | 2.615 | 825. | .6909 | .7631 | .7909 | 21.57 | .9233 | .000274 |
| .696 | 2.725 | 859. | .6977 | .7674 | .7965 | 21.74 | .9184 | .000289 |
| .729 | 2.854 | 900. | .6992 | .7683 | .7977 | 21.78 | .9126 | .000306 |
| .775 | 3.033 | 957. | .7100 | .7757 | .8064 | 22.05 | .9042 | .000331 |
| .810 | 3.172 | 1000. | .7158 | .7790 | .8111 | 22.19 | .8973 | .000352 |
| .852 | 3.336 | 1052. | .7211 | .7824 | .8152 | 22.32 | .8890 | .000376 |
| .907 | 3.550 | 1120. | .7273 | .7865 | .8201 | 22.47 | .8777 | .000409 |
| .941 | 3.684 | 1167. | .7351 | .7917 | .8262 | 22.66 | .8702 | .000430 |
| .991 | 3.878 | 1223. | .7428 | .7968 | .8321 | 22.85 | .8592 | .000461 |
| 1.041 | 4.077 | 1286. | .7495 | .8013 | .8373 | 23.01 | .8473 | .000495 |
| 1.097 | 4.255 | 1342. | .7564 | .8061 | .8425 | 23.17 | .8361 | .000526 |
| 1.129 | 4.420 | 1394. | .7619 | .8098 | .8466 | 23.30 | .8255 | .000555 |
| 1.166 | 4.564 | 1440. | .7689 | .8147 | .8519 | 23.47 | .8159 | .000581 |
| 1.247 | 4.882 | 1540. | .7807 | .8230 | .8606 | 23.74 | .7938 | .000641 |

| Y (CM) | Y/THETA | Y-PLUS | TABLE A13. (CONT.) M/ME | RHO/RHNE | U/UE | U-PLUS | TAU/TAU-MAX | V/U |
|--------|---------|--------|----------------------------|----------|--------|--------|-------------|---------|
| 1.284 | 5.076 | 1585. | .7851 | .8261 | .8637 | 23.84 | .7833 | .000669 |
| 1.311 | 5.130 | 1618. | .7883 | .8284 | .8661 | 23.92 | .7755 | .000690 |
| 1.346 | 5.269 | 1662. | .7935 | .8321 | .8698 | 24.04 | .7651 | .000718 |
| 1.382 | 5.409 | 1706. | .7989 | .8360 | .8737 | 24.16 | .7542 | .000746 |
| 1.428 | 5.587 | 1762. | .8062 | .8414 | .8790 | 24.33 | .7400 | .000784 |
| 1.466 | 5.737 | 1810. | .8107 | .8446 | .8821 | 24.43 | .7278 | .000815 |
| 1.516 | 5.935 | 1872. | .8160 | .8485 | .8858 | 24.55 | .7111 | .000858 |
| 1.552 | 6.075 | 1916. | .8225 | .8534 | .8903 | 24.70 | .6991 | .000889 |
| 1.586 | 6.209 | 1959. | .8264 | .8563 | .8931 | 24.79 | .6873 | .000919 |
| 1.640 | 6.417 | 2024. | .8350 | .8628 | .8990 | 24.98 | .6685 | .000967 |
| 1.699 | 6.611 | 2085. | .8399 | .8665 | .9023 | 25.08 | .6507 | .001012 |
| 1.725 | 6.750 | 2129. | .8442 | .8697 | .9052 | 25.18 | .6376 | .001044 |
| 1.773 | 6.939 | 2189. | .8537 | .8770 | .9115 | 25.39 | .6196 | .001089 |
| 1.816 | 7.108 | 2242. | .8557 | .8787 | .9129 | 25.43 | .6031 | .001130 |
| 1.856 | 7.262 | 2291. | .8632 | .8845 | .9179 | 25.59 | .5879 | .001167 |
| 1.904 | 7.451 | 2351. | .8694 | .8893 | .9219 | 25.73 | .5689 | .001214 |
| 1.951 | 7.635 | 2408. | .8733 | .8924 | .9244 | 25.81 | .5501 | .001259 |
| 1.998 | 7.819 | 2466. | .8788 | .8968 | .9280 | 25.93 | .5311 | .001305 |
| 2.041 | 7.988 | 2520. | .8843 | .9011 | .9315 | 26.04 | .5134 | .001348 |
| 2.090 | 8.181 | 2581. | .8903 | .9060 | .9353 | 26.17 | .4928 | .001397 |
| 2.139 | 8.370 | 2641. | .8963 | .9108 | .9391 | 26.30 | .4776 | .001445 |
| 2.197 | 8.559 | 2700. | .9018 | .9154 | .9426 | 26.42 | .4523 | .001493 |
| 2.224 | 8.703 | 2746. | .9056 | .9184 | .9449 | 26.49 | .4365 | .001530 |
| 2.281 | 8.927 | 2816. | .9115 | .9233 | .9486 | 26.62 | .4123 | .001587 |
| 2.332 | 9.126 | 2879. | .9181 | .9288 | .9526 | 26.75 | .3906 | .001638 |
| 2.367 | 9.265 | 2923. | .9218 | .9319 | .9549 | 26.83 | .3753 | .001673 |
| 2.416 | 9.454 | 2982. | .9270 | .9362 | .9580 | 26.93 | .3547 | .001721 |
| 2.461 | 9.633 | 3039. | .9335 | .9417 | .9619 | 27.07 | .3351 | .001766 |
| 2.493 | 9.757 | 3078. | .9365 | .9443 | .9637 | 27.13 | .3216 | .001797 |
| 2.541 | 9.946 | 3138. | .9414 | .9485 | .9667 | 27.23 | .3011 | .001843 |
| 2.578 | 10.090 | 3183. | .9449 | .9514 | .9687 | 27.30 | .2856 | .001879 |
| 2.607 | 10.204 | 3219. | .9482 | .9543 | .9707 | 27.36 | .2734 | .001906 |
| 2.659 | 10.408 | 3283. | .9514 | .9570 | .9725 | 27.43 | .2517 | .001955 |
| 2.705 | 10.597 | 3340. | .9568 | .9617 | .9757 | 27.54 | .2330 | .001998 |
| 2.808 | 10.990 | 3467. | .9652 | .9690 | .9805 | 27.70 | .1918 | .002090 |
| 2.845 | 11.134 | 3512. | .9692 | .9725 | .9828 | 27.78 | .1775 | .002122 |
| 2.875 | 11.253 | 3550. | .9707 | .9738 | .9836 | 27.81 | .1658 | .002148 |
| 2.921 | 11.432 | 3606. | .9734 | .9762 | .9852 | 27.86 | .1485 | .002186 |
| 2.978 | 11.656 | 3677. | .9775 | .9798 | .9875 | 27.94 | .1276 | .002233 |
| 3.005 | 11.760 | 3710. | .9800 | .9820 | .9889 | 27.99 | .1181 | .002254 |
| 3.058 | 11.949 | 3776. | .9822 | .9840 | .9901 | 28.03 | .0996 | .002295 |
| 3.093 | 12.103 | 3818. | .9840 | .9854 | .9911 | 28.07 | .0881 | .002320 |
| 3.122 | 12.217 | 3854. | .9856 | .9871 | .9920 | 28.10 | .0785 | .002341 |
| 3.175 | 12.426 | 3920. | .9890 | .9901 | .9939 | 28.17 | .0617 | .002378 |
| 3.240 | 12.759 | 4025. | .9915 | .9924 | .9953 | 28.22 | .0366 | .002433 |
| 3.312 | 12.963 | 4089. | .9932 | .9938 | .9962 | 28.25 | .0224 | .002463 |
| 3.345 | 13.092 | 4130. | .9948 | .9953 | .9971 | 28.28 | .0139 | .002482 |
| 3.383 | 13.241 | 4177. | .9953 | .9958 | .9974 | 28.29 | .0046 | .002502 |
| 3.425 | 13.405 | 4229. | .9964 | .9967 | .9980 | 28.31 | 0.0000 | .002512 |
| 3.460 | 13.539 | 4271. | .9973 | .9975 | .9985 | 28.33 | 0.0000 | .002512 |
| 3.546 | 13.877 | 4378. | .9983 | .9985 | .9991 | 28.35 | 0.0000 | .002517 |
| 3.625 | 14.185 | 4475. | .9994 | .9995 | .9997 | 28.37 | 0.0000 | .002512 |
| 3.663 | 14.334 | 4522. | .9994 | .9995 | .9997 | 28.37 | 0.0000 | .002517 |
| 3.710 | 14.518 | 4580. | 1.0000 | 1.0000 | 1.0000 | 28.38 | 0.0000 | .002512 |
| 3.744 | 14.652 | 4627. | .9998 | .9999 | .9999 | 28.37 | 0.0000 | .002512 |
| 3.782 | 14.801 | 4669. | 1.0001 | 1.0001 | 1.0000 | 28.38 | 0.0000 | .002512 |

TABLE A13. (CONT.)
 PROFILE - JPL-5 - - - PITOT PRESSURE DATA

EDGE MACH NO.= 2.1722 TOTAL PRESSURE= .9331E+05 N/M**2
 X= 7.62 CM TOTAL TEMPERATURE= 312.05 DEG-K

UE= 552.35 M/SEC DELTA STAR= .8137 CM THETA= .2601 CM H= 3.127
 RE-DELTA-STAR= 78400. RE-THETA= 25060. NUWALL= 1.7570 CM**2/SEC

LEAST SQUARE FIT PARAMETERS
 UTAU= 21.3250 M/SEC CF= .001624 PI= .6275 DELTA= 3.4898 CM
 CHISQR= .9870E-05 YMAX= 3.295 CM YMIN= .153 CM

| Y (CM) | Y7THETA | Y-PLUS | M/ME | RHO/RHNE | U/UE | U-PLUS | TAU/TAU-MAX | V/U |
|--------|---------|--------|--------|----------|--------|--------|-------------|----------|
| 0.000 | 0.000 | 0. | 0.0000 | .5448 | 0.0000 | 0.00 | 1.0000 | 0.000000 |
| .010 | .038 | 12. | .2989 | .5855 | .3906 | 10.23 | 1.0000 | 0.000000 |
| .011 | .043 | 13. | .3327 | .5952 | .4313 | 11.33 | .9999 | 0.000000 |
| .031 | .121 | 38. | .4332 | .6303 | .5457 | 14.47 | .9991 | .000007 |
| .059 | .229 | 72. | .4762 | .6481 | .5915 | 15.76 | .9976 | .000016 |
| .083 | .322 | 101. | .5042 | .6606 | .6203 | 16.57 | .9960 | .000024 |
| .099 | .380 | 120. | .5221 | .6689 | .6383 | 17.09 | .9949 | .000029 |
| .111 | .429 | 135. | .5326 | .6740 | .6488 | 17.39 | .9939 | .000033 |
| .134 | .517 | 163. | .5425 | .6788 | .6585 | 17.67 | .9921 | .000041 |
| .153 | .590 | 186. | .5544 | .6848 | .6700 | 18.00 | .9905 | .000048 |
| .191 | .736 | 232. | .5746 | .6951 | .6891 | 18.56 | .9871 | .000061 |
| .223 | .859 | 271. | .5884 | .7024 | .7020 | 18.94 | .9841 | .000073 |
| .248 | .956 | 302. | .5962 | .7067 | .7093 | 19.15 | .9815 | .000082 |
| .294 | 1.093 | 345. | .6103 | .7144 | .7221 | 19.53 | .9778 | .000096 |
| .332 | 1.278 | 403. | .6217 | .7208 | .7322 | 19.83 | .9725 | .000115 |
| .378 | 1.374 | 434. | .6281 | .7244 | .7380 | 20.00 | .9696 | .000125 |
| .397 | 1.527 | 482. | .6368 | .7294 | .7456 | 20.23 | .9649 | .000141 |
| .447 | 1.718 | 542. | .6476 | .7358 | .7550 | 20.52 | .9587 | .000162 |
| .490 | 1.884 | 594. | .6538 | .7394 | .7603 | 20.67 | .9530 | .000180 |
| .513 | 1.971 | 622. | .6610 | .7437 | .7664 | 20.86 | .9498 | .000190 |
| .558 | 2.147 | 678. | .6711 | .7499 | .7750 | 21.12 | .9433 | .000211 |
| .576 | 2.294 | 724. | .6757 | .7527 | .7788 | 21.24 | .9377 | .000229 |
| .637 | 2.450 | 773. | .6818 | .7564 | .7839 | 21.39 | .9314 | .000249 |
| .678 | 2.606 | 823. | .6909 | .7621 | .7914 | 21.62 | .9248 | .000269 |
| .723 | 2.782 | 878. | .6958 | .7652 | .7954 | 21.74 | .9171 | .000297 |
| .753 | 2.894 | 914. | .7020 | .7692 | .8004 | 21.90 | .9121 | .000307 |
| .781 | 3.001 | 947. | .7030 | .7698 | .8013 | 21.92 | .9071 | .000322 |
| .820 | 3.153 | 995. | .7138 | .7767 | .8099 | 22.19 | .8998 | .000344 |
| .861 | 3.309 | 1045. | .7184 | .7797 | .8135 | 22.30 | .8920 | .000366 |
| .894 | 3.436 | 1085. | .7252 | .7842 | .8189 | 22.47 | .8855 | .000385 |
| .932 | 3.582 | 1131. | .7299 | .7873 | .8226 | 22.58 | .8777 | .000409 |
| .975 | 3.748 | 1183. | .7371 | .7922 | .8282 | 22.76 | .8685 | .000434 |
| 1.070 | 3.846 | 1214. | .7410 | .7948 | .8312 | 22.85 | .8630 | .000450 |
| 1.036 | 3.983 | 1257. | .7431 | .7962 | .8328 | 22.90 | .8550 | .000472 |
| 1.087 | 4.158 | 1313. | .7521 | .8023 | .8397 | 23.12 | .8445 | .000502 |
| 1.116 | 4.290 | 1354. | .7569 | .8056 | .8433 | 23.23 | .8363 | .000524 |
| 1.153 | 4.431 | 1399. | .7623 | .8093 | .8473 | 23.36 | .8272 | .000549 |
| 1.203 | 4.627 | 1461. | .7692 | .8141 | .8524 | 23.52 | .8143 | .000585 |
| 1.239 | 4.764 | 1504. | .7749 | .8182 | .8567 | 23.66 | .8049 | .000610 |
| 1.273 | 4.895 | 1546. | .7787 | .8208 | .8595 | 23.74 | .7957 | .000635 |
| 1.322 | 5.081 | 1604. | .7872 | .8269 | .8657 | 23.94 | .7822 | .000671 |

TABLE A13. (CONT.)
H/ME RHO/RHOF

| Y (CM) | Y/THETA | Y-PLUS | H/ME | RHO/RHOF | U/UE | U-PLUS | TAU/TAU-MAX | V/U |
|--------|---------|--------|--------|----------|--------|--------|-------------|---------|
| 1.367 | 5.256 | 1660. | .7919 | .8303 | .8691 | 24.05 | .7692 | .000706 |
| 1.417 | 5.447 | 1720. | .8000 | .8362 | .8749 | 24.24 | .7545 | .000744 |
| 1.478 | 5.681 | 1794. | .8072 | .8414 | .8800 | 24.40 | .7358 | .000793 |
| 1.511 | 5.808 | 1834. | .8112 | .8444 | .8878 | 24.49 | .7254 | .000920 |
| 1.567 | 6.003 | 1895. | .8171 | .8488 | .8869 | 24.62 | .7090 | .000862 |
| 1.610 | 6.189 | 1954. | .8269 | .8561 | .8937 | 24.84 | .6930 | .000903 |
| 1.654 | 6.360 | 2008. | .8309 | .8591 | .8964 | 24.93 | .6779 | .000941 |
| 1.704 | 6.550 | 2068. | .8357 | .8623 | .8993 | 25.03 | .6607 | .000985 |
| 1.742 | 6.696 | 2114. | .8390 | .8652 | .9019 | 25.11 | .6472 | .001019 |
| 1.795 | 6.901 | 2179. | .8485 | .8726 | .9084 | 25.32 | .6279 | .001067 |
| 1.838 | 7.067 | 2231. | .8559 | .8783 | .9133 | 25.48 | .6119 | .001106 |
| 1.882 | 7.233 | 2284. | .8598 | .8814 | .9159 | 25.57 | .5957 | .001146 |
| 1.930 | 7.419 | 2342. | .8651 | .8855 | .9193 | 25.68 | .5772 | .001191 |
| 1.969 | 7.570 | 2390. | .8706 | .8898 | .9229 | 25.80 | .5620 | .001228 |
| 2.004 | 7.702 | 2432. | .8742 | .8927 | .9253 | 25.88 | .5486 | .001261 |
| 2.053 | 7.892 | 2492. | .8808 | .8980 | .9295 | 26.02 | .5289 | .001308 |
| 2.103 | 8.083 | 2552. | .8862 | .9023 | .9330 | 26.13 | .5090 | .001356 |
| 2.139 | 8.224 | 2597. | .8905 | .9058 | .9356 | 26.22 | .4941 | .001391 |
| 2.175 | 8.361 | 2640. | .8935 | .9082 | .9375 | 26.29 | .4793 | .001427 |
| 2.235 | 8.590 | 2712. | .8985 | .9123 | .9407 | 26.39 | .4551 | .001484 |
| 2.273 | 8.737 | 2759. | .9048 | .9175 | .9446 | 26.52 | .4393 | .001521 |
| 2.316 | 8.903 | 2811. | .9099 | .9217 | .9478 | 26.63 | .4214 | .001563 |
| 2.364 | 9.088 | 2870. | .9169 | .9275 | .9520 | 26.78 | .4010 | .001610 |
| 2.402 | 9.235 | 2916. | .9208 | .9307 | .9544 | 26.85 | .3854 | .001647 |
| 2.458 | 9.449 | 2984. | .9254 | .9347 | .9572 | 26.95 | .3620 | .001700 |
| 2.490 | 9.606 | 3033. | .9293 | .9379 | .9595 | 27.03 | .3451 | .001739 |
| 2.538 | 9.757 | 3081. | .9352 | .9429 | .9631 | 27.15 | .3287 | .001777 |
| 2.579 | 9.913 | 3130. | .9394 | .9465 | .9656 | 27.23 | .3119 | .001815 |
| 2.618 | 10.064 | 3178. | .9434 | .9500 | .9679 | 27.32 | .2957 | .001852 |
| 2.646 | 10.172 | 3212. | .9468 | .9529 | .9699 | 27.38 | .2843 | .001878 |
| 2.644 | 10.318 | 3258. | .9494 | .9551 | .9715 | 27.44 | .2688 | .001913 |
| 2.733 | 10.504 | 3317. | .9536 | .9587 | .9739 | 27.52 | .2493 | .001957 |
| 2.773 | 10.640 | 3366. | .9584 | .9629 | .9767 | 27.61 | .2332 | .001993 |
| 2.815 | 10.821 | 3417. | .9629 | .9668 | .9792 | 27.70 | .2167 | .002030 |
| 2.877 | 11.060 | 3492. | .9675 | .9709 | .9819 | 27.79 | .1927 | .002084 |
| 2.934 | 11.280 | 3562. | .9695 | .9727 | .9830 | 27.83 | .1712 | .002137 |
| 2.987 | 11.480 | 3625. | .9746 | .9772 | .9859 | 27.93 | .1521 | .002174 |
| 3.035 | 11.666 | 3683. | .9779 | .9801 | .9878 | 28.00 | .1349 | .002212 |
| 3.096 | 11.900 | 3757. | .9832 | .9849 | .9907 | 28.10 | .1139 | .002259 |
| 3.154 | 12.124 | 3828. | .9848 | .9863 | .9916 | 28.13 | .0947 | .002301 |
| 3.200 | 12.300 | 3884. | .9878 | .9889 | .9933 | 28.19 | .0802 | .002333 |
| 3.253 | 12.505 | 3949. | .9904 | .9913 | .9947 | 28.24 | .0637 | .002369 |
| 3.295 | 12.666 | 3999. | .9921 | .9928 | .9956 | 28.27 | .0516 | .002395 |
| 3.337 | 12.827 | 4050. | .9939 | .9944 | .9966 | 28.31 | .0399 | .002421 |
| 3.375 | 12.974 | 4097. | .9949 | .9954 | .9972 | 28.33 | .0303 | .002442 |
| 3.423 | 13.159 | 4155. | .9953 | .9957 | .9974 | 28.33 | .0182 | .002468 |
| 3.481 | 13.379 | 4224. | .9969 | .9972 | .9983 | 28.37 | .0048 | .002497 |
| 3.516 | 13.516 | 4268. | .9978 | .9980 | .9988 | 28.38 | 0.0000 | .002508 |
| 3.552 | 13.652 | 4311. | .9989 | .9990 | .9994 | 28.40 | 0.0000 | .002508 |
| 3.601 | 13.843 | 4371. | .9993 | .9993 | .9996 | 28.41 | 0.0000 | .002508 |
| 3.637 | 13.979 | 4414. | 1.0003 | 1.0003 | 1.0002 | 28.43 | 0.0000 | .002508 |
| 3.665 | 14.087 | 4448. | 1.0005 | 1.0005 | 1.0003 | 28.44 | 0.0000 | .002508 |
| 3.716 | 14.282 | 4510. | 1.0007 | 1.0006 | 1.0004 | 28.44 | 0.0000 | .002508 |

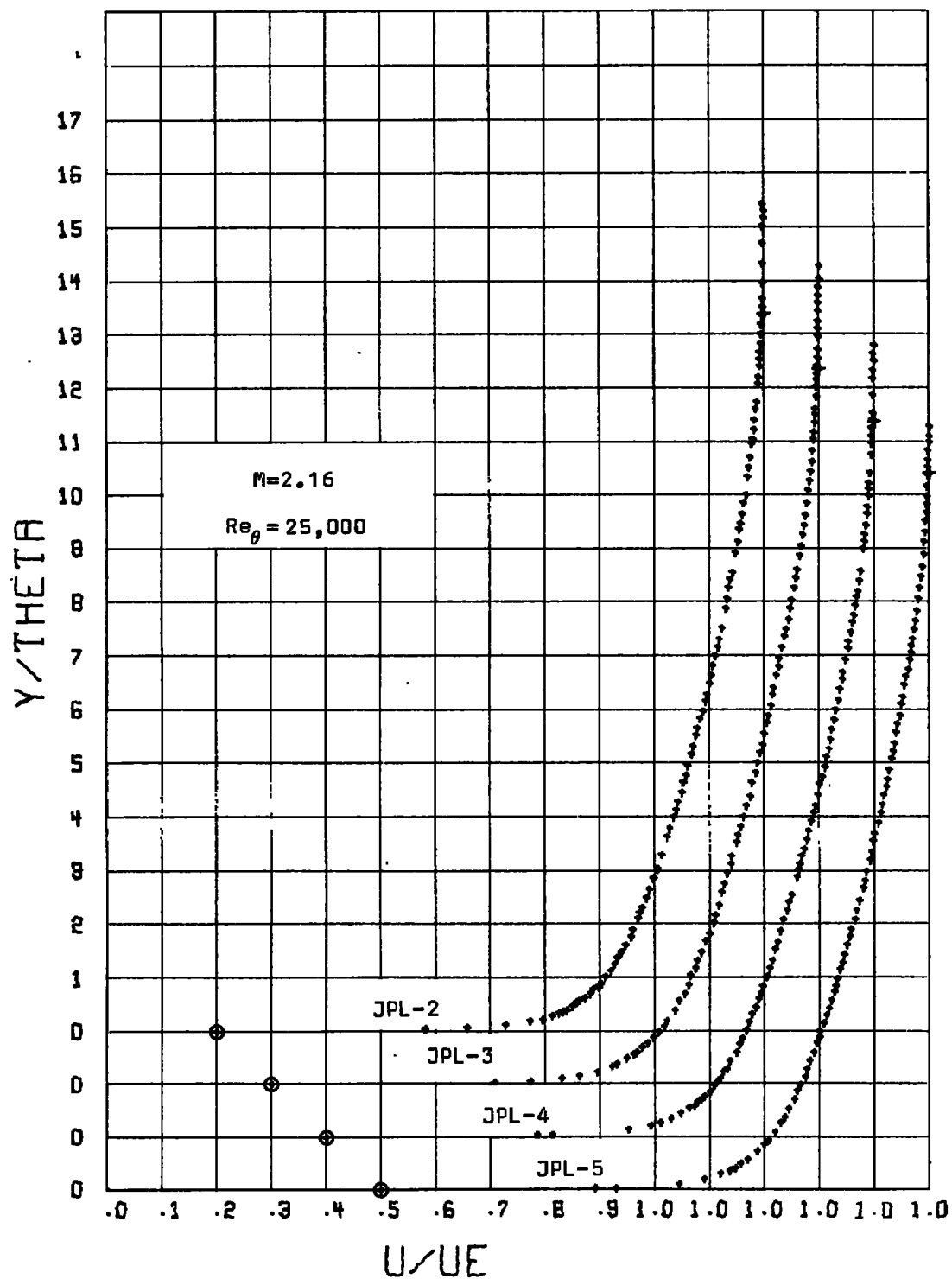


Figure A37. Mean Velocity Profiles.

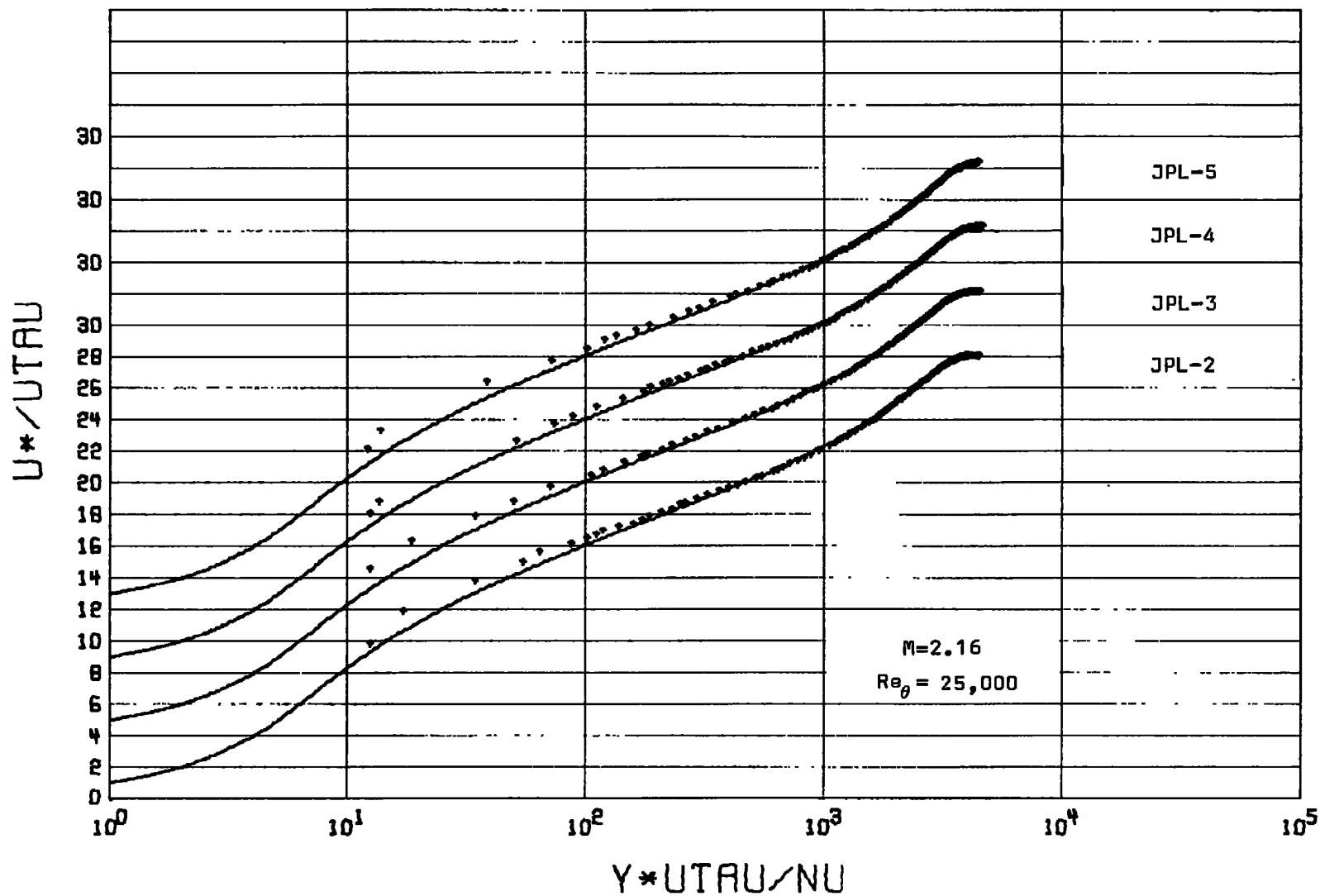


Figure A38. Van Driest Scaled Mean Velocity Profiles.

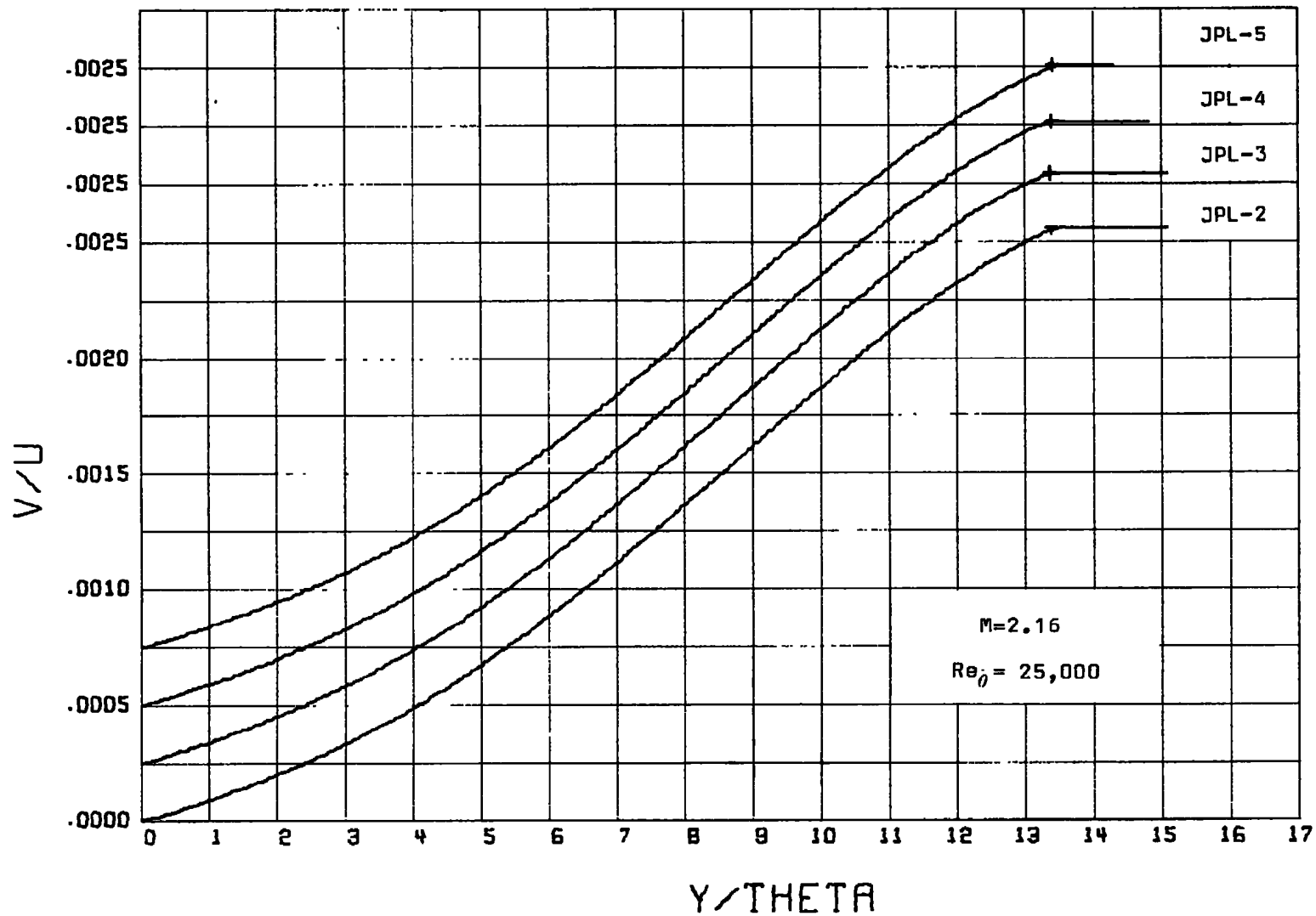


Figure A39. Normal Velocity Distribution.

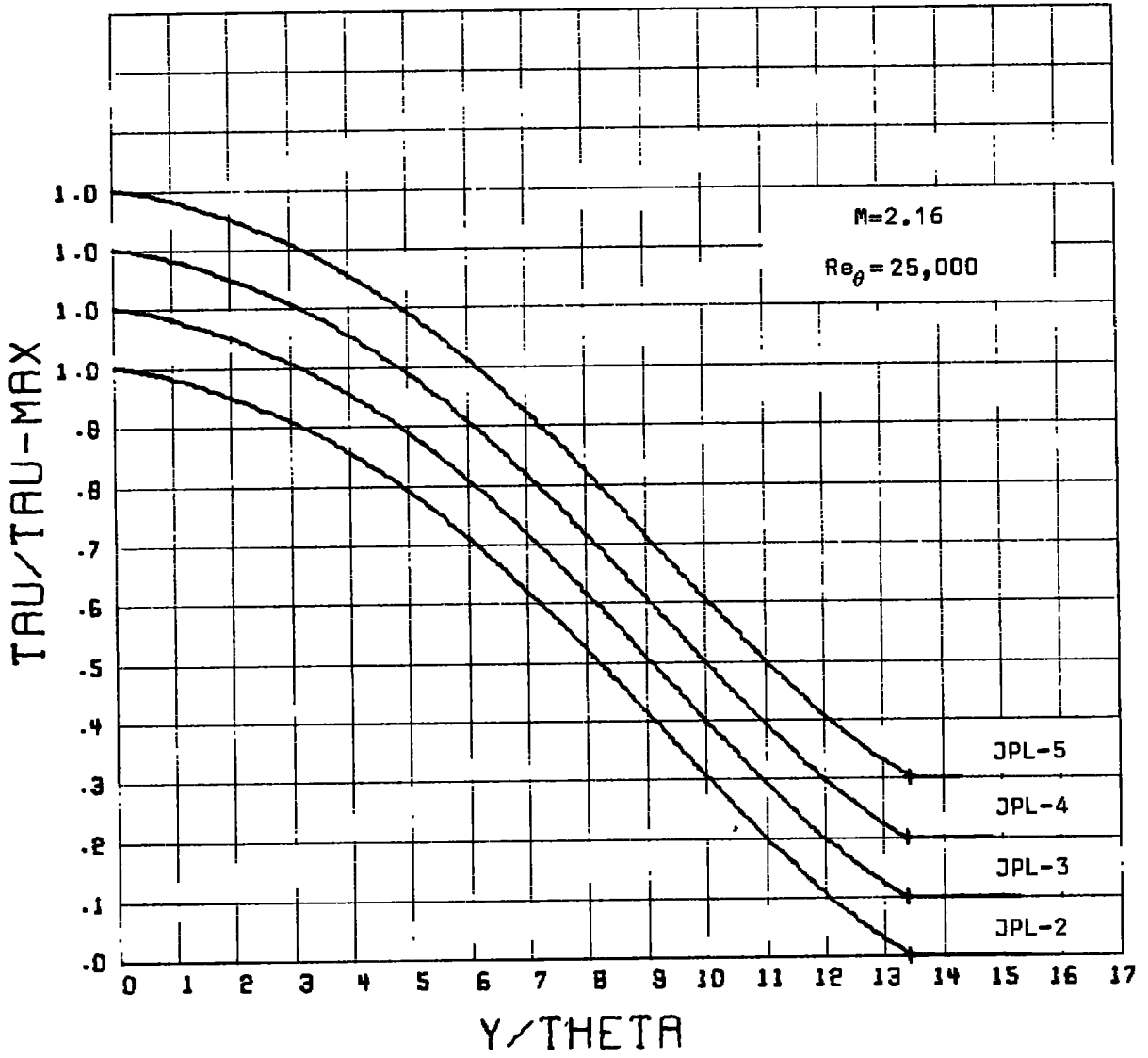


Figure A40. Shear Stress Distribution.

TABLE A14. DATA SUMMARY
PROFILE - JPL-2 - - - PITOT PRESSURE DATA

EDGE MACH NO.= 2.1812
X=-26.21 CM

TOTAL PRESSURE= .1799E+06 N/M**2
TOTAL TEMPERATURE= 324.18 DEG-K

UF= 544.19 M/SEC
RE-DELTA-STAR= 118400.

DELTA STAR= .6873 CM
RE-THETA= 38050.

THETA= .2208 CM
NUWALL= .9992 CM**2/SFC
H= 3.112

LEAST SQUARE FIT PARAMETERS

UTAU= 21.2104 M/SEC
CHISQR= .8426E-05

CF= .001534
YMAX= 2.923 CM

PI= .5705
YMIN= .082 CM

DELTA= 3.0800 CM

| Y (CM) | Y/THETA | Y-PLUS | M/ME | RHO/RHOE | U/UE | U-PLUS | TAU/TAU-MAX | V/U |
|--------|---------|--------|--------|----------|--------|--------|-------------|----------|
| 0.000 | 0.000 | 0. | 0.0000 | .5428 | 0.0000 | 0.00 | 1.0000 | 0.000000 |
| .010 | .046 | 21. | .3429 | .5966 | .4440 | 11.99 | 1.0000 | 0.000000 |
| .022 | .103 | 48. | .4149 | .6215 | .5263 | 14.31 | .9993 | .000004 |
| .043 | .149 | 70. | .4437 | .6328 | .5578 | 15.21 | .9986 | .000008 |
| .055 | .253 | 118. | .4964 | .6555 | .6131 | 16.81 | .9969 | .000016 |
| .069 | .316 | 148. | .5140 | .6636 | .6310 | 17.34 | .9957 | .000021 |
| .082 | .373 | 175. | .5305 | .6715 | .6474 | 17.82 | .9946 | .000026 |
| .104 | .471 | 271. | .5504 | .6813 | .6668 | 18.40 | .9926 | .000034 |
| .133 | .603 | 383. | .5741 | .6935 | .6804 | 19.07 | .9896 | .000046 |
| .166 | .753 | 533. | .5903 | .7021 | .7045 | 19.53 | .9860 | .000059 |
| .195 | .885 | 615. | .6024 | .7087 | .7155 | 19.86 | .9826 | .000071 |
| .250 | 1.132 | 931. | .6232 | .7204 | .7343 | 20.44 | .9758 | .000093 |
| .299 | 1.311 | 114. | .6380 | .7289 | .7472 | 20.83 | .9706 | .000110 |
| .322 | 1.460 | 168. | .6459 | .7335 | .7541 | 21.05 | .9660 | .000125 |
| .337 | 1.529 | 171. | .6502 | .7361 | .7578 | 21.16 | .9638 | .000132 |
| .377 | 1.707 | 200. | .6584 | .7410 | .7648 | 21.38 | .9580 | .000150 |
| .416 | 1.886 | 284. | .6668 | .7461 | .7720 | 21.60 | .9518 | .000168 |
| .441 | 2.001 | 338. | .6743 | .7507 | .7782 | 21.80 | .9477 | .000181 |
| .478 | 2.167 | 401. | .6810 | .7548 | .7838 | 21.97 | .9416 | .000199 |
| .504 | 2.282 | 470. | .6877 | .7590 | .7893 | 22.14 | .9372 | .000212 |
| .543 | 2.461 | 553. | .6943 | .7632 | .7948 | 22.32 | .9302 | .000232 |
| .577 | 2.616 | 626. | .7025 | .7684 | .8014 | 22.52 | .9238 | .000250 |
| .654 | 2.961 | 888. | .7160 | .7772 | .8121 | 22.97 | .9088 | .000292 |
| .688 | 3.116 | 1061. | .7217 | .7810 | .8167 | 23.01 | .9016 | .000312 |
| .737 | 3.341 | 1566. | .7317 | .7872 | .8241 | 23.25 | .8909 | .000341 |
| .767 | 3.473 | 1628. | .7368 | .7910 | .8295 | 23.39 | .8843 | .000359 |
| .810 | 3.668 | 1719. | .7434 | .7955 | .8335 | 23.55 | .8742 | .000386 |
| .852 | 3.858 | 1808. | .7507 | .8004 | .8390 | 23.73 | .8640 | .000413 |
| .897 | 4.019 | 1884. | .7560 | .8041 | .8431 | 23.86 | .8551 | .000437 |
| .970 | 4.393 | 2059. | .7683 | .8127 | .8522 | 24.16 | .8332 | .000494 |
| 1.008 | 4.565 | 2140. | .7727 | .8158 | .8555 | 24.26 | .8225 | .000521 |
| 1.043 | 4.724 | 2216. | .7804 | .8213 | .8611 | 24.45 | .8123 | .000547 |
| 1.080 | 4.893 | 2294. | .7856 | .8250 | .8649 | 24.57 | .8013 | .000575 |
| 1.115 | 5.048 | 2366. | .7915 | .8292 | .8692 | 24.71 | .7909 | .000601 |
| 1.203 | 5.451 | 2455. | .8044 | .8386 | .8784 | 25.01 | .7624 | .000672 |
| 1.242 | 5.623 | 2636. | .8092 | .8427 | .8817 | 25.13 | .7497 | .000704 |
| 1.308 | 5.923 | 2776. | .8223 | .8519 | .8908 | 25.43 | .7268 | .000760 |
| 1.357 | 6.147 | 2881. | .8272 | .8556 | .8942 | 25.54 | .7089 | .000803 |
| 1.389 | 6.291 | 2949. | .8327 | .8599 | .8980 | 25.67 | .6973 | .000831 |
| 1.430 | 6.475 | 3035. | .8390 | .8646 | .9027 | 25.81 | .6818 | .000869 |
| 1.473 | 6.670 | 3127. | .8430 | .8677 | .9049 | 25.90 | .6653 | .000907 |

TABLE A14. (CONT.)
M/ME RHO/RHOE

| Y (CM) | Y/THFTA | Y-PLUS | M/ME | RHO/RHOE | U/UE | U-PLUS | TAU/TAU-MAX | V/U |
|--------|---------|--------|--------|----------|--------|--------|-------------|---------|
| 1.508 | 6.831 | 3202. | .8474 | .8712 | .9079 | 26.00 | .6513 | .000940 |
| 1.544 | 6.997 | 3278. | .8545 | .8767 | .9126 | 26.16 | .6371 | .000974 |
| 1.598 | 7.239 | 3394. | .8595 | .8805 | .9159 | 26.27 | .6147 | .001026 |
| 1.629 | 7.377 | 3458. | .8630 | .8833 | .9182 | 26.35 | .6020 | .001055 |
| 1.661 | 7.521 | 3526. | .8682 | .8874 | .9216 | 26.46 | .5886 | .001086 |
| 1.699 | 7.694 | 3607. | .8761 | .8937 | .9267 | 26.64 | .5723 | .001124 |
| 1.743 | 7.895 | 3701. | .8770 | .8945 | .9273 | 26.66 | .5530 | .001168 |
| 1.770 | 8.016 | 3758. | .8827 | .8990 | .9309 | 26.78 | .5413 | .001195 |
| 1.828 | 8.280 | 3882. | .8900 | .9050 | .9356 | 26.94 | .5153 | .001254 |
| 1.846 | 8.407 | 3941. | .8954 | .9094 | .9389 | 27.06 | .5027 | .001282 |
| 1.894 | 8.579 | 4022. | .8976 | .9112 | .9403 | 27.10 | .4854 | .001321 |
| 1.931 | 8.746 | 4100. | .9020 | .9148 | .9431 | 27.20 | .4686 | .001358 |
| 1.981 | 8.970 | 4205. | .9067 | .9186 | .9459 | 27.30 | .4458 | .001409 |
| 2.057 | 9.315 | 4367. | .9174 | .9276 | .9525 | 27.53 | .4105 | .001487 |
| 2.095 | 9.488 | 4448. | .9226 | .9320 | .9557 | 27.64 | .3928 | .001526 |
| 2.128 | 9.637 | 4518. | .9241 | .9333 | .9566 | 27.67 | .3774 | .001560 |
| 2.156 | 9.764 | 4577. | .9306 | .9388 | .9605 | 27.80 | .3643 | .001589 |
| 2.200 | 9.965 | 4671. | .9337 | .9410 | .9620 | 27.86 | .3436 | .001634 |
| 2.230 | 10.097 | 4733. | .9369 | .9441 | .9642 | 27.93 | .3301 | .001663 |
| 2.270 | 10.281 | 4820. | .9418 | .9484 | .9671 | 28.04 | .3112 | .001704 |
| 2.298 | 10.408 | 4879. | .9449 | .9510 | .9689 | 28.10 | .2984 | .001732 |
| 2.364 | 10.707 | 5019. | .9494 | .9549 | .9715 | 28.19 | .2682 | .001796 |
| 2.397 | 10.856 | 5089. | .9546 | .9594 | .9746 | 28.30 | .2533 | .001828 |
| 2.435 | 11.029 | 5170. | .9577 | .9621 | .9763 | 28.36 | .2362 | .001865 |
| 2.489 | 11.210 | 5283. | .9631 | .9669 | .9794 | 28.47 | .2127 | .001915 |
| 2.517 | 11.397 | 5343. | .9668 | .9702 | .9816 | 28.55 | .2006 | .001940 |
| 2.550 | 11.547 | 5413. | .9697 | .9728 | .9832 | 28.61 | .1865 | .001970 |
| 2.598 | 11.765 | 5515. | .9728 | .9755 | .9850 | 28.67 | .1662 | .002013 |
| 2.628 | 11.903 | 5580. | .9757 | .9781 | .9866 | 28.73 | .1536 | .002039 |
| 2.664 | 12.064 | 5655. | .9771 | .9793 | .9873 | 28.75 | .1393 | .002069 |
| 2.700 | 12.225 | 5731. | .9807 | .9825 | .9894 | 28.83 | .1252 | .002099 |
| 2.733 | 12.375 | 5801. | .9822 | .9839 | .9902 | 28.86 | .1125 | .002126 |
| 2.776 | 12.570 | 5893. | .9840 | .9855 | .9917 | 28.89 | .0963 | .002159 |
| 2.806 | 12.708 | 5957. | .9867 | .9879 | .9927 | 28.95 | .0853 | .002187 |
| 2.861 | 12.955 | 6073. | .9878 | .9889 | .9933 | 28.97 | .0662 | .002222 |
| 2.890 | 13.088 | 6135. | .9900 | .9909 | .9945 | 29.01 | .0564 | .002242 |
| 2.923 | 13.237 | 6205. | .9912 | .9920 | .9952 | 29.03 | .0457 | .002264 |
| 2.960 | 13.404 | 6284. | .9919 | .9927 | .9956 | 29.05 | .0341 | .002288 |
| 2.990 | 13.542 | 6348. | .9936 | .9942 | .9965 | 29.08 | .0252 | .002307 |
| 3.020 | 13.674 | 6410. | .9940 | .9946 | .9967 | 29.09 | .0169 | .002324 |
| 3.061 | 13.864 | 6499. | .9947 | .9952 | .9971 | 29.10 | .0055 | .002347 |
| 3.100 | 14.036 | 6580. | .9960 | .9963 | .9978 | 29.13 | 0.0000 | .002359 |
| 3.139 | 14.215 | 6664. | .9965 | .9968 | .9981 | 29.14 | 0.0000 | .002359 |
| 3.200 | 14.491 | 6793. | .9977 | .9979 | .9987 | 29.16 | 0.0000 | .002359 |
| 3.255 | 14.784 | 6931. | .9986 | .9987 | .9992 | 29.18 | 0.0000 | .002359 |
| 3.337 | 15.112 | 7084. | .9985 | .9986 | .9992 | 29.18 | 0.0000 | .002359 |
| 3.395 | 15.376 | 7208. | .9992 | .9993 | .9996 | 29.19 | 0.0000 | .002359 |
| 3.470 | 15.716 | 7367. | .9996 | .9997 | .9998 | 29.20 | 0.0000 | .002359 |
| 3.545 | 16.055 | 7526. | .9996 | .9997 | .9998 | 29.20 | 0.0000 | .002359 |
| 3.606 | 16.331 | 7656. | .9998 | .9998 | .9999 | 29.20 | 0.0000 | .002359 |
| 3.637 | 16.469 | 7720. | .9996 | .9996 | .9998 | 29.20 | 0.0000 | .002359 |
| 3.690 | 16.664 | 7812. | .9998 | .9998 | .9999 | 29.20 | 0.0000 | .002359 |
| 3.713 | 16.814 | 7882. | 1.0000 | 1.0000 | 1.0000 | 29.21 | 0.0000 | .002359 |
| 3.760 | 17.027 | 7982. | 1.0005 | 1.0005 | 1.0002 | 29.22 | 0.0000 | .002359 |

TABLE A14. (CONT.)
PROFILE - JPL-3 - - - PITOT PRESSURE DATA

EDGE MACH NO.= 2.1737 TOTAL PRESSURE= .1802E+06 N/M**2
X= -7.62 CM TOTAL TEMPERATURE= 321.27 DEG-K

UE= 560.66 M/SEC DELTA STAR= .6942 CM THETA= .2240 CM H= 3.098
RE-DELTA-STAR= 125700. RE-THETA= 40570. NUHALL= .9729 CM**2/SEC

LEAST SQUARE FIT PARAMETERS
UTAU= 71.0165 M/SEC CF= .001530 PI= .5692 DELTA= 3.1256 CM
CHISOR= .5273E-05 YMAX= 2.961 CM YMIN= .078 CM

| Y (CM) | Y/THETA | Y-PLUS | M/ME | RHO/RHOE | U/UE | U-PLUS | TAU/TAU-MAX | V/U |
|--------|---------|--------|--------|----------|--------|--------|-------------|----------|
| 0.000 | 0.000 | 0. | 0.0000 | .5445 | 0.0000 | 0.00 | 1.0000 | 0.000000 |
| .010 | .045 | 21. | .3431 | .5981 | .4436 | 12.02 | 1.0000 | 0.000000 |
| .026 | .119 | 57. | .4316 | .6294 | .5441 | 14.86 | .9991 | .000005 |
| .034 | .170 | 82. | .4675 | .6441 | .5826 | 15.97 | .9983 | .000009 |
| .062 | .277 | 134. | .5028 | .6597 | .6191 | 17.03 | .9965 | .000018 |
| .078 | .351 | 170. | .5243 | .6697 | .6406 | 17.67 | .9950 | .000024 |
| .099 | .442 | 213. | .5454 | .6800 | .6614 | 18.29 | .9932 | .000032 |
| .121 | .544 | 263. | .5575 | .6861 | .6730 | 18.63 | .9910 | .000040 |
| .138 | .617 | 299. | .5707 | .6929 | .6856 | 19.01 | .9893 | .000046 |
| .149 | .668 | 323. | .5808 | .6982 | .6951 | 19.30 | .9880 | .000051 |
| .168 | .753 | 364. | .5886 | .7023 | .7023 | 19.52 | .9860 | .000058 |
| .205 | .918 | 444. | .6055 | .7115 | .7179 | 19.99 | .9817 | .000073 |
| .238 | 1.065 | 515. | .6198 | .7195 | .7307 | 20.38 | .9777 | .000086 |
| .271 | 1.213 | 587. | .6290 | .7248 | .7389 | 20.63 | .9735 | .000100 |
| .294 | 1.315 | 636. | .6378 | .7298 | .7466 | 20.87 | .9705 | .000110 |
| .332 | 1.485 | 718. | .6504 | .7372 | .7575 | 21.21 | .9652 | .000126 |
| .369 | 1.649 | 798. | .6583 | .7419 | .7642 | 21.42 | .9599 | .000143 |
| .400 | 1.785 | 864. | .6643 | .7455 | .7694 | 21.58 | .9554 | .000156 |
| .439 | 1.961 | 949. | .6715 | .7499 | .7754 | 21.77 | .9492 | .000175 |
| .482 | 2.153 | 1042. | .6819 | .7563 | .7841 | 22.04 | .9422 | .000195 |
| .515 | 2.301 | 1113. | .6924 | .7629 | .7927 | 22.31 | .9366 | .000212 |
| .551 | 2.460 | 1190. | .6961 | .7652 | .7957 | 22.41 | .9303 | .000230 |
| .594 | 2.652 | 1283. | .7043 | .7704 | .8023 | 22.61 | .9224 | .000252 |
| .641 | 2.862 | 1385. | .7128 | .7760 | .8092 | 22.83 | .9134 | .000277 |
| .676 | 3.021 | 1462. | .7193 | .7807 | .8143 | 23.00 | .9067 | .000297 |
| .715 | 3.191 | 1544. | .7268 | .7851 | .8202 | 23.19 | .8983 | .000318 |
| .762 | 3.401 | 1646. | .7333 | .7895 | .8253 | 23.35 | .8881 | .000346 |
| .800 | 3.571 | 1728. | .7398 | .7938 | .8303 | 23.51 | .8796 | .000369 |
| .840 | 3.752 | 1816. | .7472 | .7988 | .8360 | 23.69 | .8701 | .000394 |
| .880 | 3.928 | 1901. | .7552 | .8043 | .8421 | 23.89 | .8605 | .000419 |
| .909 | 4.058 | 1964. | .7577 | .8061 | .8440 | 23.95 | .8532 | .000438 |
| .941 | 4.200 | 2032. | .7643 | .8106 | .8489 | 24.11 | .8451 | .000459 |
| .991 | 4.427 | 2142. | .7723 | .8162 | .8548 | 24.30 | .8315 | .000494 |
| 1.033 | 4.614 | 2233. | .7770 | .8195 | .8583 | 24.42 | .8200 | .000524 |
| 1.073 | 4.789 | 2318. | .7851 | .8252 | .8642 | 24.61 | .8087 | .000552 |
| 1.125 | 5.022 | 2430. | .7915 | .8299 | .8688 | 24.76 | .7933 | .000591 |
| 1.163 | 5.192 | 2512. | .7977 | .8344 | .8733 | 24.91 | .7816 | .000620 |
| 1.198 | 5.350 | 2589. | .8022 | .8376 | .8765 | 25.02 | .7704 | .000647 |
| 1.236 | 5.520 | 2672. | .8102 | .8436 | .8827 | 25.20 | .7581 | .000678 |
| 1.276 | 5.696 | 2757. | .8133 | .8458 | .8843 | 25.28 | .7450 | .000710 |
| 1.318 | 5.883 | 2847. | .8181 | .8494 | .8877 | 25.39 | .7307 | .000744 |

| Y (CM) | Y/THETA | Y-PLUS | TABLE A14. (CONT.) | | U/U _E | U-PLUS | TAU/TAU-MAX | V/U |
|--------|---------|--------|--------------------|----------------------|------------------|--------|-------------|---------|
| | | | M/ME | RHO/RHO _E | | | | |
| 1.357 | 6.059 | 2932. | .8252 | .8547 | .8926 | 25.55 | .7169 | .000777 |
| 1.404 | 6.269 | 3034. | .8319 | .8597 | .8972 | 25.70 | .7000 | .000818 |
| 1.447 | 6.461 | 3127. | .8367 | .8634 | .9005 | 25.82 | .6841 | .000856 |
| 1.503 | 6.711 | 3248. | .8482 | .8723 | .9082 | 26.08 | .6629 | .000905 |
| 1.531 | 6.836 | 3308. | .8515 | .8747 | .9104 | 26.15 | .6521 | .000931 |
| 1.567 | 6.994 | 3385. | .8542 | .8769 | .9122 | 26.21 | .6381 | .000963 |
| 1.612 | 7.198 | 3484. | .8604 | .8817 | .9163 | 26.35 | .6196 | .001007 |
| 1.656 | 7.391 | 3577. | .8666 | .8866 | .9203 | 26.49 | .6022 | .001047 |
| 1.691 | 7.550 | 3654. | .8688 | .8884 | .9218 | 26.54 | .5874 | .001081 |
| 1.727 | 7.708 | 3731. | .8750 | .8932 | .9258 | 26.67 | .5724 | .001115 |
| 1.770 | 7.901 | 3824. | .8816 | .8986 | .9300 | 26.82 | .5540 | .001157 |
| 1.799 | 8.032 | 3887. | .8842 | .9006 | .9317 | 26.87 | .5414 | .001185 |
| 1.832 | 8.179 | 3958. | .8882 | .9039 | .9342 | 26.96 | .5271 | .001218 |
| 1.884 | 8.411 | 4071. | .8952 | .9095 | .9386 | 27.11 | .5041 | .001269 |
| 1.920 | 8.570 | 4148. | .8980 | .9118 | .9404 | 27.18 | .4883 | .001304 |
| 1.953 | 8.717 | 4219. | .9023 | .9154 | .9431 | 27.27 | .4735 | .001337 |
| 2.004 | 8.944 | 4329. | .9088 | .9207 | .9471 | 27.41 | .4506 | .001388 |
| 2.037 | 9.092 | 4400. | .9118 | .9232 | .9490 | 27.47 | .4356 | .001421 |
| 2.056 | 9.177 | 4441. | .9144 | .9253 | .9505 | 27.53 | .4270 | .001440 |
| 2.098 | 9.364 | 4532. | .9184 | .9287 | .9530 | 27.61 | .4079 | .001482 |
| 2.156 | 9.624 | 4658. | .9269 | .9358 | .9581 | 27.79 | .3811 | .001540 |
| 2.193 | 9.789 | 4737. | .9296 | .9381 | .9597 | 27.85 | .3643 | .001576 |
| 2.242 | 10.010 | 4844. | .9353 | .9429 | .9631 | 27.97 | .3417 | .001625 |
| 2.280 | 10.180 | 4927. | .9400 | .9470 | .9660 | 28.07 | .3243 | .001663 |
| 2.315 | 10.333 | 5001. | .9440 | .9505 | .9683 | 28.15 | .3088 | .001696 |
| 2.360 | 10.537 | 5100. | .9484 | .9542 | .9709 | 28.24 | .2882 | .001740 |
| 2.416 | 10.786 | 5220. | .9519 | .9573 | .9729 | 28.31 | .2632 | .001793 |
| 2.457 | 10.968 | 5308. | .9588 | .9632 | .9769 | 28.45 | .2457 | .001831 |
| 2.514 | 11.223 | 5432. | .9638 | .9677 | .9798 | 28.56 | .2205 | .001883 |
| 2.550 | 11.382 | 5508. | .9667 | .9702 | .9815 | 28.61 | .2053 | .001915 |
| 2.590 | 11.563 | 5596. | .9675 | .9709 | .9819 | 28.63 | .1882 | .001951 |
| 2.640 | 11.784 | 5703. | .9731 | .9758 | .9851 | 28.74 | .1678 | .001994 |
| 2.680 | 11.965 | 5791. | .9761 | .9785 | .9867 | 28.80 | .1515 | .002028 |
| 2.727 | 12.175 | 5892. | .9787 | .9808 | .9882 | 28.86 | .1331 | .002066 |
| 2.773 | 12.379 | 5991. | .9818 | .9836 | .9900 | 28.92 | .1155 | .002103 |
| 2.811 | 12.549 | 6073. | .9828 | .9845 | .9905 | 28.94 | .1017 | .002132 |
| 2.847 | 12.708 | 6150. | .9854 | .9868 | .9919 | 28.99 | .0888 | .002158 |
| 2.882 | 12.867 | 6227. | .9874 | .9886 | .9931 | 29.03 | .0767 | .002183 |
| 2.921 | 13.037 | 6309. | .9885 | .9896 | .9937 | 29.05 | .0640 | .002210 |
| 2.961 | 13.218 | 6397. | .9900 | .9909 | .9945 | 29.08 | .0509 | .002236 |
| 3.012 | 13.445 | 6507. | .9909 | .9918 | .9950 | 29.10 | .0355 | .002268 |
| 3.053 | 13.676 | 6595. | .9921 | .9929 | .9957 | 29.12 | .0238 | .002292 |
| 3.089 | 13.785 | 6672. | .9935 | .9941 | .9964 | 29.15 | .0141 | .002312 |
| 3.124 | 13.944 | 6748. | .9949 | .9954 | .9972 | 29.18 | .0050 | .002331 |
| 3.154 | 14.080 | 6814. | .9951 | .9955 | .9973 | 29.18 | 0.0000 | .002341 |
| 3.171 | 14.153 | 6850. | .9950 | .9955 | .9973 | 29.18 | 0.0000 | .002341 |
| 3.213 | 14.340 | 6940. | .9964 | .9968 | .9980 | 29.21 | 0.0000 | .002341 |
| 3.284 | 14.658 | 7094. | .9976 | .9978 | .9986 | 29.23 | 0.0000 | .002341 |
| 3.361 | 15.004 | 7261. | .9986 | .9987 | .9992 | 29.25 | 0.0000 | .002341 |
| 3.435 | 15.332 | 7421. | .9989 | .9990 | .9994 | 29.26 | 0.0000 | .002341 |
| 3.535 | 15.780 | 7637. | .9997 | .9997 | .9998 | 29.27 | 0.0000 | .002341 |
| 3.611 | 16.120 | 7802. | .9996 | .9996 | .9997 | 29.27 | 0.0000 | .002341 |
| 3.698 | 16.506 | 7988. | 1.0001 | 1.0001 | 1.0000 | 29.28 | 0.0000 | .002341 |
| 3.731 | 16.653 | 8060. | 1.0001 | 1.0001 | 1.0000 | 29.28 | 0.0000 | .002341 |

TABLE A14. (CONT.)
PROFILE - JPL-4 - - - PITOT PRESSURE DATA

EDGE MACH NO.= 2.1820
X= 0.00 CM

TOTAL PRESSURE= .1798E+06 N/M**2
TOTAL TEMPERATURE= 321.27 DEG-K

UE= 561.76 M/SEC
RE-DELTA-STAR= 129100.

DELTA STAR= .7178 CM
RE-THETA= 41600.

THETA= .2312 CM
NUWALL= .9781 CM**2/SEC

H= 3.104
CF= .001445

LEAST SQUARE FIT PARAMETERS

UTAU= 71.0772 M/SEC
CHISQR= .2030F-04

CF= .001527
YMAX= 3.094 CM

PI= .5463
YMIN= .063 CM

DELTA= 3.2627 CM

| Y (CM) | Y/THETA | Y-PLUS | M/ME | RHO/RH0E | U/UE | U-PLUS | TAU/TAU-MAX | V/U |
|--------|---------|--------|--------|----------|--------|--------|-------------|----------|
| 0.000 | 0.000 | 0. | 0.0000 | .5426 | 0.0000 | 0.00 | 1.0000 | 0.000000 |
| .010 | .043 | 21. | .3418 | .5961 | .4427 | 11.98 | 1.0000 | 0.000000 |
| .017 | .076 | 38. | .4041 | .6173 | .5143 | 14.00 | .9996 | .000002 |
| .036 | .159 | 79. | .4662 | .6420 | .5818 | 15.94 | .9984 | .000009 |
| .052 | .225 | 112. | .5009 | .6574 | .6178 | 16.98 | .9973 | .000014 |
| .063 | .274 | 136. | .5214 | .6670 | .6384 | 17.59 | .9964 | .000018 |
| .093 | .406 | 202. | .5437 | .6778 | .6604 | 18.24 | .9938 | .000029 |
| .112 | .510 | 254. | .5615 | .6868 | .6775 | 18.76 | .9916 | .000038 |
| .142 | .615 | 306. | .5779 | .6954 | .6930 | 19.22 | .9892 | .000047 |
| .167 | .724 | 361. | .5915 | .7026 | .7056 | 19.60 | .9865 | .000056 |
| .179 | .774 | 385. | .6017 | .7082 | .7150 | 19.89 | .9853 | .000061 |
| .215 | .933 | 465. | .6127 | .7143 | .7249 | 20.19 | .9811 | .000075 |
| .254 | 1.098 | 547. | .6276 | .7228 | .7382 | 20.60 | .9765 | .000090 |
| .306 | 1.323 | 659. | .6414 | .7308 | .7503 | 20.97 | .9699 | .000111 |
| .330 | 1.427 | 711. | .6480 | .7347 | .7560 | 21.15 | .9667 | .000121 |
| .372 | 1.608 | 801. | .6565 | .7397 | .7633 | 21.37 | .9609 | .000139 |
| .416 | 1.801 | 897. | .6646 | .7446 | .7701 | 21.59 | .9544 | .000159 |
| .447 | 1.932 | 963. | .6727 | .7496 | .7770 | 21.80 | .9498 | .000173 |
| .481 | 2.081 | 1037. | .6819 | .7553 | .7847 | 22.04 | .9444 | .000188 |
| .523 | 2.262 | 1127. | .6900 | .7603 | .7912 | 22.25 | .9376 | .000208 |
| .557 | 2.410 | 1201. | .6956 | .7639 | .7958 | 22.39 | .9318 | .000225 |
| .594 | 2.569 | 1280. | .7048 | .7698 | .8033 | 22.63 | .9254 | .000243 |
| .643 | 2.784 | 1387. | .7089 | .7725 | .8066 | 22.73 | .9163 | .000268 |
| .673 | 2.910 | 1450. | .7177 | .7787 | .8136 | 22.96 | .9108 | .000284 |
| .711 | 3.075 | 1532. | .7225 | .7814 | .8173 | 23.08 | .9033 | .000304 |
| .753 | 3.255 | 1622. | .7285 | .7854 | .8220 | 23.23 | .8948 | .000327 |
| .797 | 3.448 | 1718. | .7353 | .7899 | .8273 | 23.40 | .8854 | .000353 |
| .831 | 3.596 | 1792. | .7416 | .7942 | .8322 | 23.55 | .8780 | .000373 |
| .866 | 3.745 | 1866. | .7476 | .7983 | .8368 | 23.70 | .8703 | .000393 |
| .919 | 3.975 | 1981. | .7549 | .8033 | .8423 | 23.88 | .8578 | .000426 |
| .960 | 4.151 | 2068. | .7606 | .8072 | .8465 | 24.02 | .8479 | .000451 |
| 1.014 | 4.347 | 2186. | .7679 | .8123 | .8520 | 24.20 | .8341 | .000487 |
| 1.052 | 4.552 | 2268. | .7746 | .8171 | .8569 | 24.36 | .8242 | .000512 |
| 1.099 | 4.711 | 2348. | .7789 | .8201 | .8601 | 24.46 | .8142 | .000538 |
| 1.140 | 4.931 | 2457. | .7885 | .8270 | .8671 | 24.69 | .8001 | .000573 |
| 1.186 | 5.128 | 2556. | .7952 | .8318 | .8719 | 24.85 | .7868 | .000606 |
| 1.226 | 5.304 | 2643. | .7981 | .8340 | .8740 | 24.92 | .7747 | .000636 |
| 1.267 | 5.480 | 2731. | .8061 | .8398 | .8796 | 25.10 | .7623 | .000667 |
| 1.313 | 5.678 | 2829. | .8122 | .8443 | .8839 | 25.25 | .7479 | .000702 |
| 1.346 | 5.920 | 2900. | .8149 | .8466 | .8858 | 25.31 | .7372 | .000729 |
| 1.395 | 6.035 | 3007. | .8242 | .8533 | .8922 | 25.52 | .7208 | .000768 |

| Y (CM) | Y/THETA | Y-PLUS | TABLE A14. (CONT.) M/ME | RHO/RHOE | U/UE | U-PLUS | TAU/TAU-MAX | V/U |
|--------|---------|--------|----------------------------|----------|--------|--------|-------------|---------|
| 1.438 | 6.221 | 3100. | .8283 | .8564 | .8950 | 25.62 | .7061 | .000803 |
| 1.475 | 6.381 | 3180. | .8348 | .8614 | .8995 | 25.77 | .6933 | .000933 |
| 1.522 | 6.584 | 3281. | .8393 | .8648 | .9025 | 25.87 | .6766 | .000873 |
| 1.564 | 6.765 | 3371. | .8463 | .8702 | .9072 | 26.03 | .6613 | .000909 |
| 1.600 | 6.919 | 3448. | .8498 | .8729 | .9096 | 26.11 | .6481 | .000940 |
| 1.645 | 7.116 | 3546. | .8581 | .8794 | .9150 | 26.29 | .6309 | .000980 |
| 1.689 | 7.303 | 3639. | .8630 | .8832 | .9182 | 26.40 | .6142 | .001019 |
| 1.732 | 7.490 | 3732. | .8676 | .8869 | .9213 | 26.50 | .5973 | .001058 |
| 1.788 | 7.731 | 3853. | .8750 | .8928 | .9261 | 26.67 | .5750 | .001109 |
| 1.822 | 7.880 | 3927. | .8775 | .8948 | .9276 | 26.72 | .5611 | .001141 |
| 1.859 | 8.039 | 4006. | .8809 | .8975 | .9298 | 26.80 | .5459 | .001175 |
| 1.903 | 8.231 | 4102. | .8867 | .9023 | .9335 | 26.92 | .5275 | .001217 |
| 1.944 | 8.407 | 4189. | .8931 | .9075 | .9376 | 27.06 | .5104 | .001255 |
| 1.982 | 8.572 | 4272. | .8969 | .9105 | .9399 | 27.14 | .4943 | .001291 |
| 2.029 | 8.775 | 4373. | .9014 | .9143 | .9427 | 27.24 | .4742 | .001336 |
| 2.067 | 8.940 | 4455. | .9079 | .9196 | .9467 | 27.38 | .4578 | .001373 |
| 2.115 | 9.148 | 4559. | .9126 | .9235 | .9496 | 27.48 | .4369 | .001419 |
| 2.162 | 9.351 | 4660. | .9165 | .9268 | .9520 | 27.56 | .4164 | .001464 |
| 2.202 | 9.522 | 4745. | .9229 | .9322 | .9558 | 27.70 | .3992 | .001502 |
| 2.235 | 9.664 | 4816. | .9249 | .9339 | .9571 | 27.74 | .3848 | .001533 |
| 2.297 | 9.890 | 4928. | .9303 | .9384 | .9603 | 27.85 | .3620 | .001583 |
| 2.329 | 10.071 | 5019. | .9357 | .9430 | .9635 | 27.97 | .3437 | .001622 |
| 2.359 | 10.203 | 5084. | .9389 | .9458 | .9654 | 28.03 | .3304 | .001651 |
| 2.410 | 10.422 | 5194. | .9434 | .9497 | .9681 | 28.13 | .3083 | .001699 |
| 2.448 | 10.587 | 5276. | .9480 | .9537 | .9707 | 28.22 | .2918 | .001734 |
| 2.446 | 10.752 | 5358. | .9508 | .9561 | .9724 | 28.28 | .2755 | .001769 |
| 2.519 | 10.894 | 5429. | .9535 | .9585 | .9740 | 28.33 | .2614 | .001799 |
| 2.567 | 11.103 | 5533. | .9587 | .9630 | .9769 | 28.44 | .2410 | .001842 |
| 2.606 | 11.268 | 5615. | .9613 | .9653 | .9784 | 28.49 | .2251 | .001876 |
| 2.630 | 11.372 | 5667. | .9649 | .9684 | .9804 | 28.57 | .2151 | .001897 |
| 2.683 | 11.603 | 5782. | .9682 | .9714 | .9824 | 28.63 | .1934 | .001943 |
| 2.707 | 11.707 | 5834. | .9705 | .9735 | .9837 | 28.68 | .1837 | .001963 |
| 2.745 | 11.872 | 5916. | .9734 | .9760 | .9853 | 28.74 | .1686 | .001995 |
| 2.780 | 12.020 | 5990. | .9757 | .9781 | .9866 | 28.78 | .1549 | .002024 |
| 2.816 | 12.179 | 6070. | .9780 | .9801 | .9879 | 28.83 | .1412 | .002052 |
| 2.844 | 12.300 | 6130. | .9797 | .9816 | .9888 | 28.86 | .1308 | .002074 |
| 2.871 | 12.416 | 6187. | .9803 | .9821 | .9891 | 28.88 | .1209 | .002095 |
| 2.915 | 12.608 | 6283. | .9837 | .9852 | .9911 | 28.94 | .1049 | .002128 |
| 2.956 | 12.784 | 6371. | .9861 | .9874 | .9924 | 28.99 | .0907 | .002157 |
| 2.987 | 12.915 | 6436. | .9861 | .9874 | .9924 | 28.99 | .0804 | .002179 |
| 3.020 | 13.058 | 6507. | .9889 | .9899 | .9939 | 29.05 | .0695 | .002201 |
| 3.070 | 13.278 | 6617. | .9913 | .9921 | .9953 | 29.10 | .0532 | .002235 |
| 3.094 | 13.382 | 6669. | .9920 | .9927 | .9956 | 29.11 | .0460 | .002250 |
| 3.140 | 13.580 | 6767. | .9932 | .9938 | .9963 | 29.13 | .0325 | .002278 |
| 3.193 | 13.766 | 6861. | .9945 | .9949 | .9970 | 29.16 | .0204 | .002303 |
| 3.224 | 13.942 | 6948. | .9958 | .9961 | .9977 | 29.18 | .0096 | .002325 |
| 3.246 | 14.036 | 6995. | .9962 | .9965 | .9979 | 29.19 | .0042 | .002336 |
| 3.277 | 14.173 | 7063. | .9969 | .9972 | .9983 | 29.20 | 0.0000 | .002345 |
| 3.324 | 14.376 | 7164. | .9973 | .9976 | .9985 | 29.21 | 0.0000 | .002345 |
| 3.347 | 14.475 | 7214. | .9976 | .9978 | .9987 | 29.22 | 0.0000 | .002345 |
| 3.407 | 14.733 | 7342. | .9987 | .9988 | .9993 | 29.24 | 0.0000 | .002345 |
| 3.487 | 15.079 | 7515. | .9991 | .9992 | .9995 | 29.25 | 0.0000 | .002345 |
| 3.583 | 15.496 | 7723. | 1.0001 | 1.0001 | 1.0000 | 29.27 | 0.0000 | .002345 |
| 3.665 | 15.848 | 7898. | .9999 | .9999 | .9999 | 29.26 | 0.0000 | .002345 |
| 3.716 | 16.067 | 8007. | 1.0003 | 1.0003 | 1.0002 | 29.27 | 0.0000 | .002345 |

TABLE A14. (CONT.)
 PROFILE - JPL-5 - - - PITOT PRESSURE DATA

EDGE MACH NO.= 2.1797 TOTAL PRESSURE= .1802E+06 N/M**2
 X= 7.62 CM TOTAL TEMPERATURE= 322.72 DEG-K

UE= 562.73 M/SEC
 RE-DELTA-STAR= 133800.

DELTA STAR= .7507 CM
 RE-THETA= 43060.

THETA= .7415 CM
 NUWALL= .9817 CM**2/SFC

H= 3.107

LEAST SQUARE FIT PARAMETERS

UTAU= 70.9635 M/SFC
 CHISQR= .1418E-04

CF= .001507
 YMAX= 3.188 CM

PI= .5751
 YMIN= .085 CM

DELTA= 3.3810 CM

| Y (CM) | Y/THETA | Y-PLUS | M/ME | RHO/RHOF | U/UF | II-PLUS | TAU/TAU-MAX | V/U |
|--------|---------|--------|--------|----------|--------|---------|-------------|----------|
| 0.000 | 0.000 | 0. | 0.0000 | .5431 | 0.0000 | 0.00 | 1.0000 | 0.000000 |
| .010 | .042 | 21. | .3410 | .5963 | .4416 | 12.03 | 1.0000 | 0.000000 |
| .016 | .068 | 35. | .3752 | .6075 | .4814 | 13.16 | .9997 | .000002 |
| .036 | .157 | 78. | .4571 | .6365 | .5667 | 15.61 | .9985 | .000008 |
| .059 | .241 | 124. | .4978 | .6564 | .6145 | 17.01 | .9971 | .000015 |
| .085 | .352 | 181. | .5320 | .6725 | .6488 | 18.02 | .9950 | .000024 |
| .105 | .436 | 225. | .5499 | .6813 | .6662 | 18.55 | .9933 | .000031 |
| .130 | .561 | 279. | .5700 | .6916 | .6854 | 19.13 | .9910 | .000039 |
| .157 | .651 | 336. | .5786 | .6961 | .6935 | 19.37 | .9884 | .000049 |
| .181 | .751 | 387. | .5933 | .7039 | .7071 | 19.79 | .9860 | .000057 |
| .212 | .877 | 452. | .6040 | .7098 | .7169 | 20.09 | .9828 | .000068 |
| .240 | .993 | 512. | .6140 | .7154 | .7259 | 20.36 | .9797 | .000079 |
| .265 | 1.098 | 566. | .6251 | .7217 | .7358 | 20.67 | .9768 | .000088 |
| .293 | 1.214 | 626. | .6333 | .7264 | .7431 | 20.89 | .9734 | .000099 |
| .334 | 1.382 | 713. | .6417 | .7313 | .7504 | 21.17 | .9684 | .000115 |
| .364 | 1.508 | 778. | .6519 | .7373 | .7592 | 21.40 | .9645 | .000127 |
| .402 | 1.666 | 859. | .6587 | .7414 | .7650 | 21.58 | .9594 | .000142 |
| .450 | 1.865 | 967. | .6685 | .7473 | .7733 | 21.84 | .9526 | .000162 |
| .491 | 2.034 | 1049. | .6761 | .7520 | .7796 | 22.04 | .9466 | .000180 |
| .527 | 2.181 | 1125. | .6824 | .7559 | .7849 | 22.20 | .9412 | .000196 |
| .570 | 2.360 | 1217. | .6909 | .7613 | .7919 | 22.43 | .9343 | .000215 |
| .608 | 2.518 | 1299. | .6996 | .7668 | .7990 | 22.65 | .9280 | .000233 |
| .641 | 2.654 | 1369. | .7041 | .7696 | .8026 | 22.77 | .9224 | .000249 |
| .689 | 2.854 | 1472. | .7110 | .7741 | .8081 | 22.94 | .9138 | .000272 |
| .735 | 3.043 | 1570. | .7200 | .7800 | .8152 | 23.17 | .9053 | .000295 |
| .760 | 3.148 | 1624. | .7223 | .7815 | .8171 | 23.23 | .9004 | .000309 |
| .806 | 3.338 | 1727. | .7316 | .7877 | .8243 | 23.47 | .8914 | .000333 |
| .858 | 3.553 | 1833. | .7388 | .7925 | .8299 | 23.65 | .8806 | .000361 |
| .889 | 3.679 | 1898. | .7431 | .7955 | .8332 | 23.75 | .8741 | .000378 |
| .938 | 3.884 | 2004. | .7504 | .8004 | .8388 | 23.93 | .8631 | .000407 |
| .998 | 4.089 | 2109. | .7589 | .8062 | .8451 | 24.14 | .8516 | .000437 |
| 1.072 | 4.231 | 2183. | .7678 | .8090 | .8481 | 24.24 | .8434 | .000458 |
| 1.055 | 4.368 | 2253. | .7667 | .8117 | .8510 | 24.33 | .8353 | .000478 |
| 1.101 | 4.557 | 2351. | .7717 | .8152 | .8547 | 24.46 | .8237 | .000507 |
| 1.134 | 4.694 | 2421. | .7777 | .8194 | .8591 | 24.60 | .8151 | .000529 |
| 1.177 | 4.873 | 2514. | .7844 | .8242 | .8640 | 24.76 | .8035 | .000558 |
| 1.220 | 5.052 | 2606. | .7915 | .8294 | .8691 | 24.93 | .7916 | .000587 |
| 1.257 | 5.204 | 2684. | .7964 | .8329 | .8726 | 25.05 | .7811 | .000613 |
| 1.294 | 5.356 | 2763. | .8016 | .8367 | .8764 | 25.17 | .7702 | .000640 |
| 1.339 | 5.540 | 2858. | .8055 | .8396 | .8791 | 25.26 | .7570 | .000672 |
| 1.377 | 5.703 | 2942. | .8122 | .8445 | .8838 | 25.42 | .7448 | .000701 |

| Y (CM) | Y/THETA | Y-PLUS | TABLE A14. (CONT.) | | U/U _E | U-PLUS | TAU/TAU-MAX | V/U |
|--------|---------|--------|--------------------|----------------------|------------------|--------|-------------|---------|
| | | | M/ME | RHO/RHO _E | | | | |
| 1.419 | 5.877 | 3037. | .8187 | .8494 | .8894 | 25.57 | .7316 | .000733 |
| 1.463 | 6.056 | 3124. | .8235 | .8530 | .8917 | 25.69 | .7176 | .000766 |
| 1.504 | 6.229 | 3213. | .8303 | .8581 | .8963 | 25.84 | .7037 | .000799 |
| 1.540 | 6.376 | 3289. | .8354 | .8620 | .8998 | 25.96 | .6916 | .000827 |
| 1.599 | 6.618 | 3414. | .8424 | .8674 | .9045 | 26.12 | .6713 | .000875 |
| 1.637 | 6.776 | 3495. | .8456 | .8698 | .9067 | 26.19 | .6578 | .000906 |
| 1.667 | 6.902 | 3560. | .8466 | .8706 | .9073 | 26.22 | .6467 | .000932 |
| 1.715 | 7.102 | 3663. | .8550 | .8771 | .9129 | 26.40 | .6290 | .000973 |
| 1.748 | 7.238 | 3734. | .8578 | .8793 | .9148 | 26.47 | .6166 | .001001 |
| 1.772 | 7.338 | 3785. | .8632 | .8836 | .9183 | 26.59 | .6075 | .001022 |
| 1.804 | 7.470 | 3853. | .8666 | .8862 | .9205 | 26.67 | .5953 | .001050 |
| 1.863 | 7.712 | 3978. | .8721 | .8906 | .9241 | 26.79 | .5726 | .001101 |
| 1.885 | 7.806 | 4027. | .8761 | .8938 | .9267 | 26.88 | .5636 | .001121 |
| 1.922 | 7.959 | 4105. | .8781 | .8954 | .9280 | 26.92 | .5490 | .001154 |
| 1.963 | 8.127 | 4192. | .8848 | .9008 | .9322 | 27.07 | .5326 | .001191 |
| 1.996 | 8.264 | 4263. | .8899 | .9050 | .9355 | 27.18 | .5191 | .001221 |
| 2.021 | 8.369 | 4317. | .8911 | .9059 | .9362 | 27.21 | .5086 | .001244 |
| 2.056 | 8.511 | 4390. | .8945 | .9087 | .9383 | 27.28 | .4945 | .001275 |
| 2.114 | 8.753 | 4515. | .9011 | .9141 | .9425 | 27.42 | .4704 | .001328 |
| 2.152 | 8.910 | 4596. | .9067 | .9187 | .9459 | 27.54 | .4545 | .001363 |
| 2.193 | 9.078 | 4683. | .9095 | .9211 | .9477 | 27.61 | .4374 | .001400 |
| 2.244 | 9.289 | 4792. | .9181 | .9282 | .9529 | 27.79 | .4159 | .001447 |
| 2.273 | 9.410 | 4854. | .9202 | .9300 | .9542 | 27.83 | .4035 | .001474 |
| 2.320 | 9.604 | 4954. | .9246 | .9337 | .9568 | 27.93 | .3835 | .001517 |
| 2.358 | 9.762 | 5036. | .9297 | .9381 | .9599 | 28.04 | .3673 | .001551 |
| 2.399 | 9.930 | 5122. | .9329 | .9408 | .9618 | 28.10 | .3500 | .001588 |
| 2.432 | 10.067 | 5193. | .9376 | .9448 | .9646 | 28.20 | .3360 | .001618 |
| 2.485 | 10.288 | 5307. | .9402 | .9470 | .9661 | 28.26 | .3135 | .001666 |
| 2.520 | 10.435 | 5383. | .9435 | .9499 | .9681 | 28.33 | .2986 | .001698 |
| 2.566 | 10.624 | 5480. | .9504 | .9558 | .9721 | 28.47 | .2795 | .001738 |
| 2.623 | 10.861 | 5602. | .9539 | .9589 | .9742 | 28.54 | .2558 | .001788 |
| 2.661 | 11.018 | 5684. | .9577 | .9621 | .9763 | 28.62 | .2403 | .001820 |
| 2.708 | 11.213 | 5784. | .9635 | .9672 | .9796 | 28.74 | .2213 | .001860 |
| 2.754 | 11.402 | 5882. | .9652 | .9688 | .9806 | 28.77 | .2030 | .001899 |
| 2.791 | 11.555 | 5960. | .9680 | .9713 | .9822 | 28.83 | .1887 | .001928 |
| 2.835 | 11.739 | 6055. | .9729 | .9756 | .9850 | 28.93 | .1716 | .001963 |
| 2.886 | 11.949 | 6164. | .9760 | .9783 | .9867 | 28.99 | .1525 | .002003 |
| 2.922 | 12.096 | 6240. | .9784 | .9804 | .9881 | 29.04 | .1394 | .002030 |
| 2.983 | 12.348 | 6370. | .9822 | .9839 | .9902 | 29.12 | .1173 | .002075 |
| 3.028 | 12.538 | 6468. | .9839 | .9854 | .9911 | 29.15 | .1018 | .002107 |
| 3.069 | 12.706 | 6554. | .9860 | .9873 | .9923 | 29.19 | .0882 | .002135 |
| 3.115 | 12.895 | 6652. | .9878 | .9890 | .9933 | 29.23 | .0735 | .002165 |
| 3.149 | 13.032 | 6723. | .9904 | .9913 | .9947 | 29.28 | .0632 | .002186 |
| 3.188 | 13.200 | 6809. | .9915 | .9923 | .9953 | 29.30 | .0509 | .002211 |
| 3.235 | 13.394 | 6910. | .9926 | .9933 | .9960 | 29.33 | .0374 | .002238 |
| 3.277 | 13.568 | 6999. | .9943 | .9948 | .9969 | 29.36 | .0260 | .002261 |
| 3.310 | 13.705 | 7070. | .9955 | .9959 | .9975 | 29.38 | .0173 | .002279 |
| 3.355 | 13.889 | 7165. | .9967 | .9970 | .9982 | 29.41 | .0063 | .002301 |
| 3.406 | 14.099 | 7273. | .9972 | .9974 | .9984 | 29.42 | 0.0000 | .002314 |
| 3.437 | 14.230 | 7341. | .9977 | .9979 | .9987 | 29.43 | 0.0000 | .002314 |
| 3.502 | 14.498 | 7479. | .9986 | .9988 | .9992 | 29.44 | 0.0000 | .002314 |
| 3.534 | 14.630 | 7547. | .9992 | .9993 | .9995 | 29.46 | 0.0000 | .002314 |
| 3.580 | 14.819 | 7645. | .9998 | .9998 | .9998 | 29.47 | 0.0000 | .002314 |
| 3.632 | 15.035 | 7756. | .9999 | .9999 | .9999 | 29.47 | 0.0000 | .002314 |
| 3.669 | 15.187 | 7834. | 1.0005 | 1.0005 | 1.0003 | 29.48 | 0.0000 | .002314 |
| 3.691 | 15.282 | 7883. | 1.0003 | 1.0003 | 1.0002 | 29.48 | 0.0000 | .002314 |

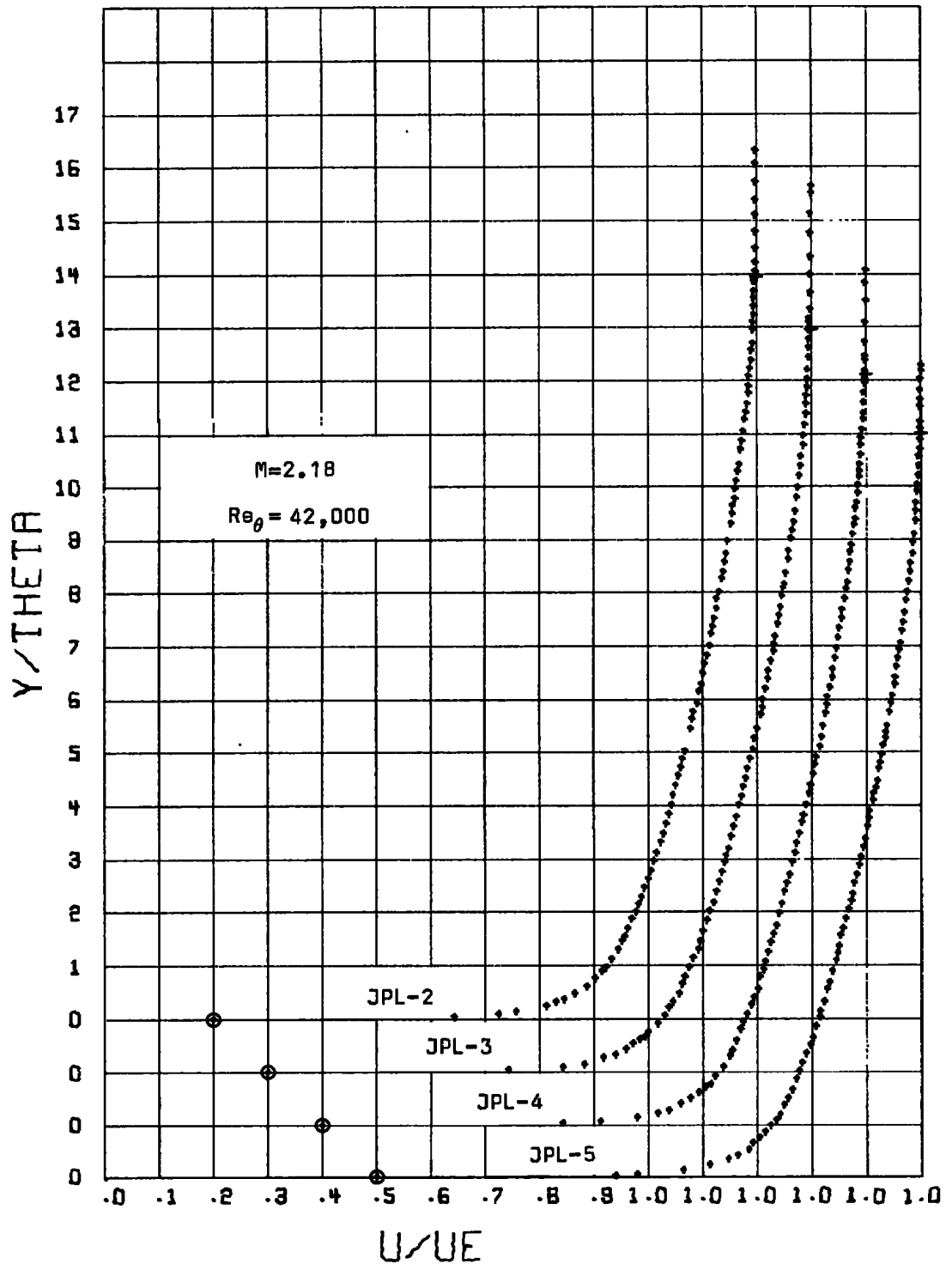


Figure A41. Mean Velocity Profiles.

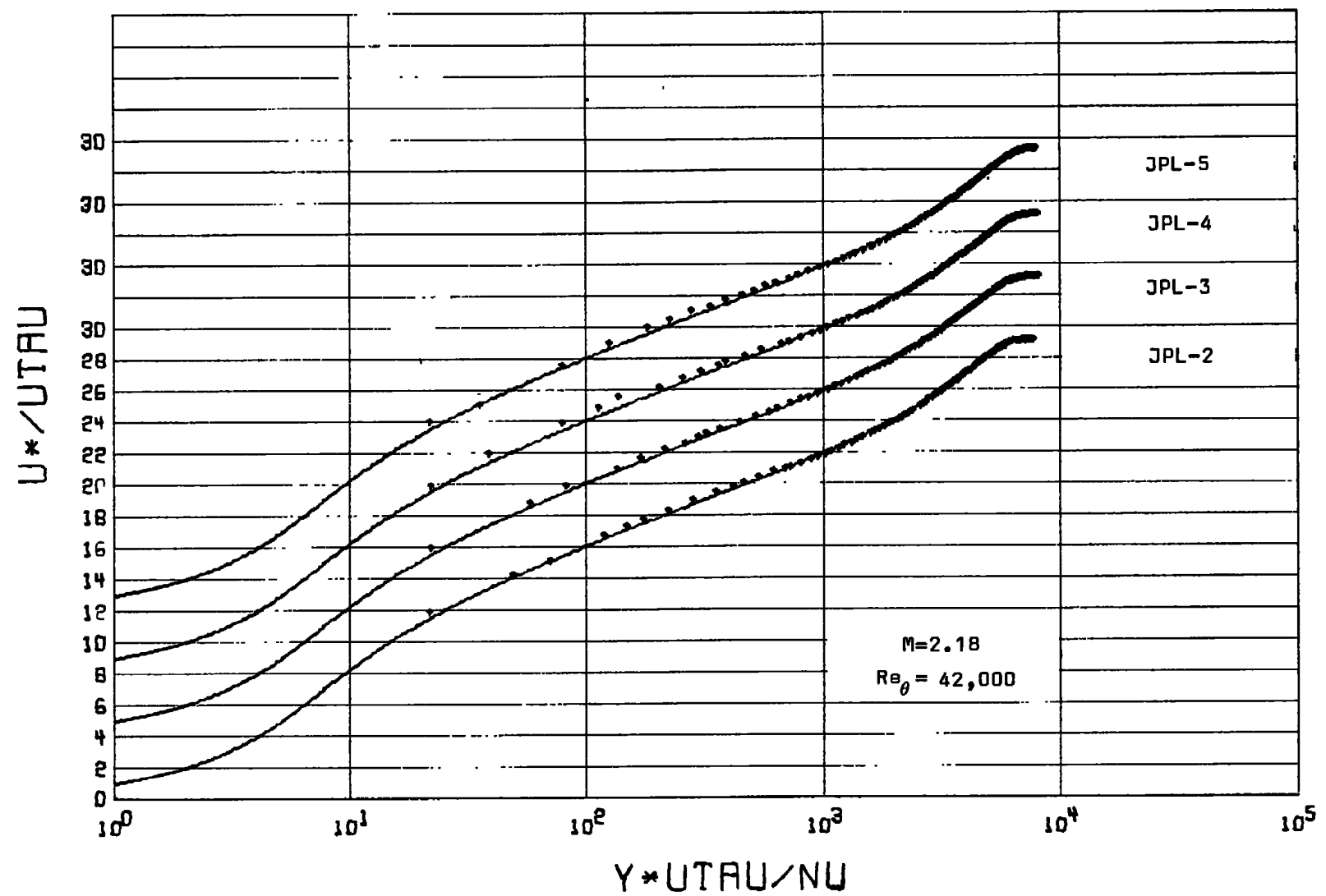


Figure A42. Van Driest Scaled Mean Velocity Profiles.

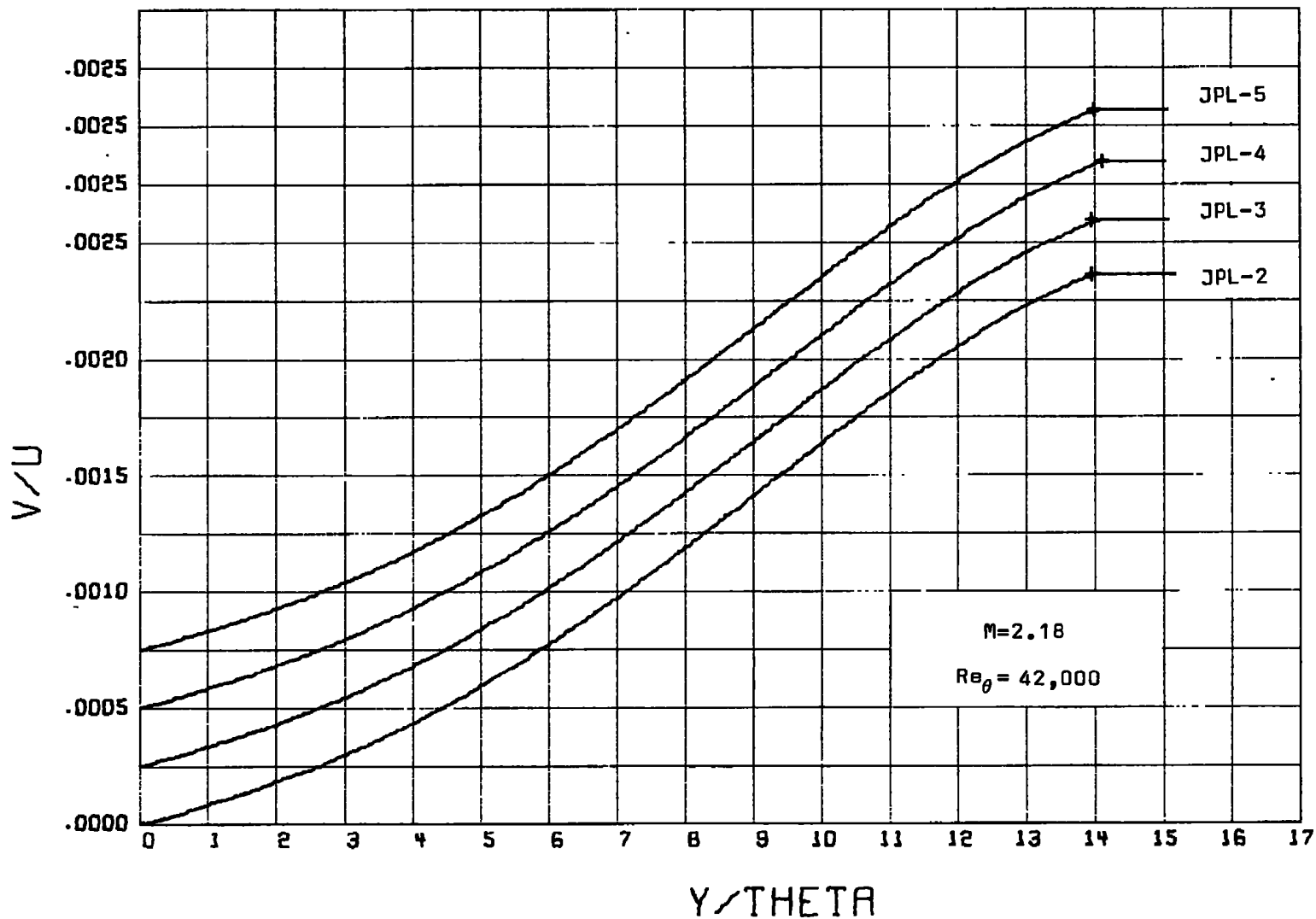


Figure A43. Normal Velocity Distribution.

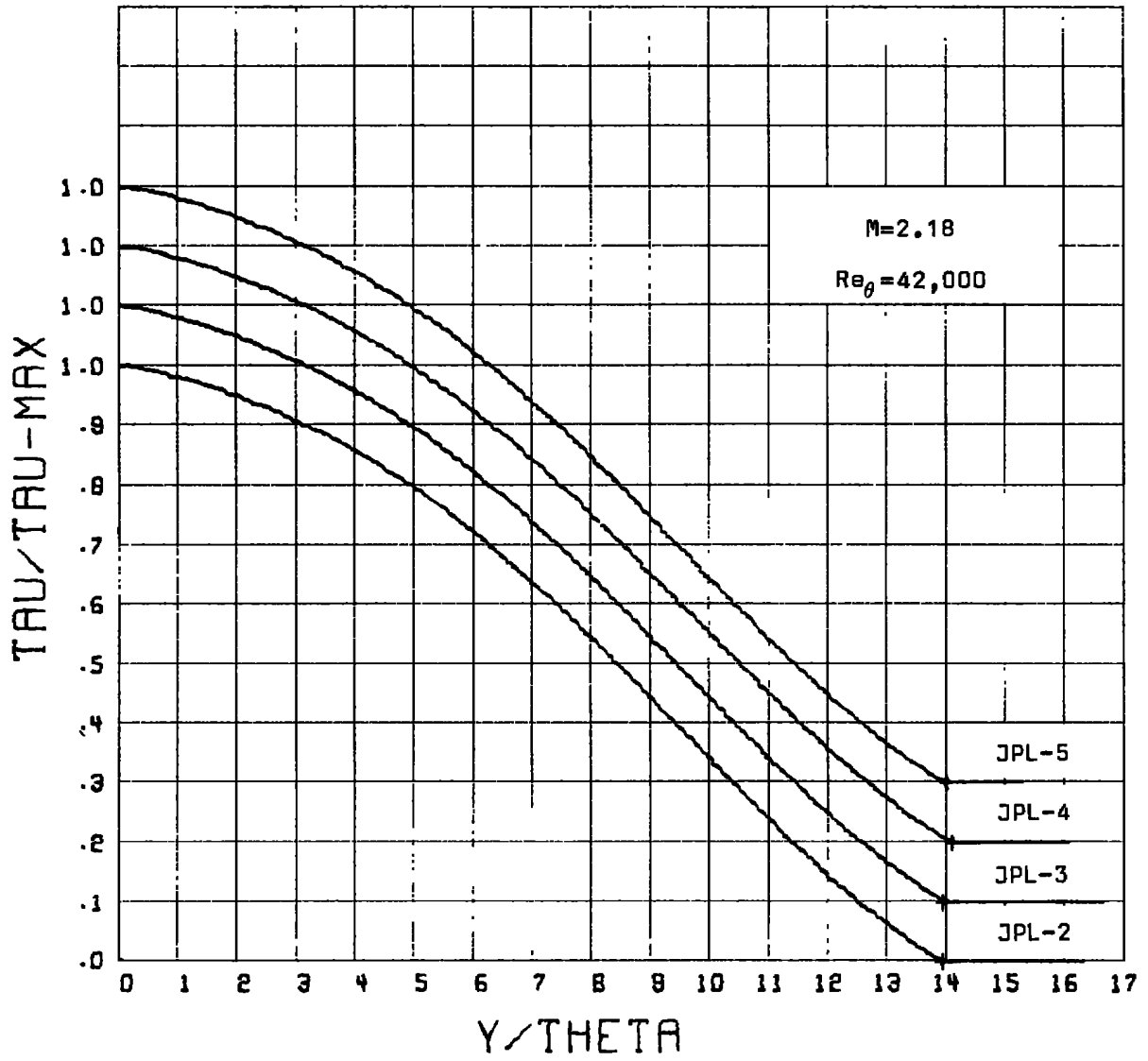


Figure A44. Shear Stress Distribution.

| TABLE A14. (CONT.) | | | | | | | | |
|--------------------|---------|--------|--------|----------|--------|--------|-------------|---------|
| Y (CM) | Y/THETA | Y-PLUS | M/ME | RHO/RHOE | U/UE | U-PLUS | TAU/TAU-MAX | V/U |
| 1.438 | 6.221 | 3100. | .8283 | .8564 | .8950 | 25.62 | .7061 | .000803 |
| 1.475 | 6.381 | 3180. | .8348 | .8614 | .8995 | 25.77 | .6933 | .000933 |
| 1.522 | 6.584 | 3281. | .8393 | .8648 | .9025 | 25.87 | .6766 | .000873 |
| 1.564 | 6.745 | 3371. | .8463 | .8702 | .9072 | 26.03 | .6613 | .000909 |
| 1.600 | 6.919 | 3448. | .8498 | .8729 | .9096 | 26.11 | .6481 | .000940 |
| 1.645 | 7.114 | 3546. | .8581 | .8794 | .9150 | 26.29 | .6309 | .000980 |
| 1.689 | 7.303 | 3639. | .8630 | .8832 | .9182 | 26.40 | .6142 | .001019 |
| 1.732 | 7.490 | 3732. | .8676 | .8869 | .9213 | 26.50 | .5973 | .001058 |
| 1.798 | 7.731 | 3853. | .8750 | .8928 | .9261 | 26.67 | .5750 | .001109 |
| 1.822 | 7.880 | 3927. | .8775 | .8948 | .9276 | 26.72 | .5611 | .001141 |
| 1.859 | 8.039 | 4006. | .8809 | .8975 | .9298 | 26.80 | .5459 | .001175 |
| 1.903 | 8.231 | 4102. | .8867 | .9023 | .9335 | 26.92 | .5275 | .001217 |
| 1.944 | 8.407 | 4189. | .8931 | .9075 | .9376 | 27.06 | .5104 | .001255 |
| 1.982 | 8.572 | 4272. | .8969 | .9105 | .9399 | 27.14 | .4943 | .001291 |
| 2.029 | 8.775 | 4373. | .9014 | .9143 | .9427 | 27.24 | .4742 | .001336 |
| 2.067 | 8.940 | 4455. | .9079 | .9196 | .9467 | 27.38 | .4578 | .001373 |
| 2.115 | 9.148 | 4559. | .9176 | .9235 | .9496 | 27.48 | .4369 | .001419 |
| 2.162 | 9.351 | 4660. | .9165 | .9268 | .9520 | 27.56 | .4164 | .001464 |
| 2.202 | 9.522 | 4745. | .9229 | .9322 | .9558 | 27.70 | .3992 | .001502 |
| 2.235 | 9.644 | 4816. | .9249 | .9339 | .9571 | 27.74 | .3848 | .001533 |
| 2.287 | 9.890 | 4928. | .9303 | .9384 | .9603 | 27.85 | .3620 | .001583 |
| 2.329 | 10.071 | 5019. | .9357 | .9430 | .9635 | 27.97 | .3437 | .001622 |
| 2.359 | 10.203 | 5084. | .9389 | .9458 | .9654 | 28.03 | .3304 | .001651 |
| 2.410 | 10.422 | 5194. | .9434 | .9497 | .9681 | 28.13 | .3083 | .001699 |
| 2.448 | 10.587 | 5276. | .9480 | .9537 | .9707 | 28.22 | .2918 | .001734 |
| 2.486 | 10.752 | 5358. | .9508 | .9561 | .9724 | 28.28 | .2755 | .001769 |
| 2.519 | 10.894 | 5429. | .9535 | .9585 | .9740 | 28.33 | .2614 | .001799 |
| 2.567 | 11.103 | 5533. | .9587 | .9630 | .9769 | 28.44 | .2410 | .001842 |
| 2.606 | 11.268 | 5615. | .9613 | .9653 | .9784 | 28.49 | .2251 | .001876 |
| 2.630 | 11.372 | 5667. | .9649 | .9684 | .9804 | 28.57 | .2151 | .001897 |
| 2.683 | 11.603 | 5782. | .9682 | .9714 | .9824 | 28.63 | .1934 | .001943 |
| 2.707 | 11.707 | 5834. | .9705 | .9735 | .9837 | 28.68 | .1837 | .001963 |
| 2.745 | 11.872 | 5916. | .9734 | .9760 | .9853 | 28.74 | .1686 | .001995 |
| 2.780 | 12.020 | 5990. | .9757 | .9781 | .9866 | 28.78 | .1549 | .002024 |
| 2.816 | 12.179 | 6070. | .9780 | .9801 | .9879 | 28.83 | .1412 | .002052 |
| 2.844 | 12.300 | 6130. | .9797 | .9816 | .9888 | 28.86 | .1308 | .002074 |
| 2.871 | 12.416 | 6187. | .9803 | .9821 | .9891 | 28.88 | .1209 | .002095 |
| 2.915 | 12.608 | 6283. | .9837 | .9852 | .9911 | 28.94 | .1049 | .002128 |
| 2.956 | 12.784 | 6371. | .9861 | .9874 | .9924 | 28.99 | .0907 | .002157 |
| 2.987 | 12.915 | 6436. | .9861 | .9874 | .9924 | 28.99 | .0804 | .002179 |
| 3.020 | 13.058 | 6507. | .9889 | .9899 | .9939 | 29.05 | .0695 | .002201 |
| 3.070 | 13.278 | 6617. | .9913 | .9921 | .9953 | 29.10 | .0532 | .002235 |
| 3.094 | 13.382 | 6669. | .9920 | .9927 | .9956 | 29.11 | .0460 | .002250 |
| 3.140 | 13.580 | 6767. | .9932 | .9938 | .9963 | 29.13 | .0325 | .002278 |
| 3.183 | 13.764 | 6861. | .9945 | .9949 | .9970 | 29.16 | .0204 | .002303 |
| 3.224 | 13.942 | 6948. | .9958 | .9961 | .9977 | 29.18 | .0096 | .002325 |
| 3.246 | 14.036 | 6995. | .9962 | .9965 | .9979 | 29.19 | .0042 | .002336 |
| 3.277 | 14.173 | 7063. | .9969 | .9972 | .9983 | 29.20 | 0.0000 | .002345 |
| 3.324 | 14.376 | 7164. | .9973 | .9976 | .9985 | 29.21 | 0.0000 | .002345 |
| 3.347 | 14.475 | 7214. | .9976 | .9978 | .9987 | 29.22 | 0.0000 | .002345 |
| 3.407 | 14.733 | 7342. | .9987 | .9988 | .9993 | 29.24 | 0.0000 | .002345 |
| 3.487 | 15.079 | 7515. | .9991 | .9992 | .9995 | 29.25 | 0.0000 | .002345 |
| 3.583 | 15.496 | 7773. | 1.0001 | 1.0001 | 1.0000 | 29.27 | 0.0000 | .002345 |
| 3.665 | 15.848 | 7898. | .9999 | .9999 | .9999 | 29.26 | 0.0000 | .002345 |
| 3.716 | 16.067 | 8007. | 1.0003 | 1.0003 | 1.0002 | 29.27 | 0.0000 | .002345 |

TABLE A14. (CONT.)
 PROFILE - JPL-5 - - - PITOT PRESSURE DATA

EDGE MACH NO.= 2.1797
 X= 7.62 CM

TOTAL PRESSURE= .1802E+06 N/M**2
 TOTAL TEMPERATURE= 322.72 DEG-K

UE= 562.73 M/SEC
 RE-DELTA-STAR= 133800.

DELTA STAR= .7507 CM
 RE-THETA= 43060.

THETA= .2415 CM
 NUWALL= .9817 CM**2/SEC H= 3.107

LEAST SQUARE FIT PARAMETERS
 UTAU= 20.9635 M/SEC
 CHISQR= .1418E-04

CF= .001507
 YMAX= 3.188 CM

PI= .5751
 YMIN= .085 CM

DELTA= 3.3810 CM

| Y (CM) | Y/THETA | Y-PLUS | M/ME | RHO/RHOE | U/UF | II-PLUS | TAU/TAU-MAX | V/U |
|--------|---------|--------|--------|----------|--------|---------|-------------|----------|
| 0.000 | 0.000 | 0. | 0.0000 | .5431 | 0.0000 | 0.00 | 1.0000 | 0.000000 |
| .010 | .042 | 21. | .3410 | .5963 | .4416 | 12.03 | 1.0000 | 0.000000 |
| .016 | .068 | 35. | .3752 | .6075 | .4814 | 13.16 | .9997 | .000002 |
| .036 | .152 | 78. | .4521 | .6365 | .5667 | 15.61 | .9985 | .000008 |
| .059 | .241 | 124. | .4978 | .6564 | .6145 | 17.01 | .9971 | .000015 |
| .085 | .352 | 181. | .5320 | .6725 | .6488 | 18.02 | .9950 | .000024 |
| .105 | .436 | 225. | .5499 | .6813 | .6662 | 18.55 | .9933 | .000031 |
| .130 | .541 | 279. | .5700 | .6916 | .6854 | 19.13 | .9910 | .000039 |
| .157 | .651 | 336. | .5786 | .6961 | .6935 | 19.37 | .9884 | .000049 |
| .181 | .751 | 387. | .5933 | .7039 | .7071 | 19.79 | .9860 | .000057 |
| .212 | .877 | 452. | .6040 | .7098 | .7169 | 20.09 | .9828 | .000068 |
| .240 | .993 | 512. | .6140 | .7154 | .7259 | 20.36 | .9797 | .000079 |
| .265 | 1.098 | 566. | .6251 | .7217 | .7358 | 20.67 | .9768 | .000088 |
| .293 | 1.214 | 626. | .6333 | .7264 | .7431 | 20.89 | .9734 | .000099 |
| .334 | 1.382 | 713. | .6417 | .7313 | .7504 | 21.12 | .9684 | .000115 |
| .364 | 1.508 | 778. | .6519 | .7373 | .7592 | 21.40 | .9645 | .000127 |
| .402 | 1.666 | 859. | .6587 | .7414 | .7650 | 21.58 | .9594 | .000142 |
| .450 | 1.866 | 962. | .6685 | .7473 | .7733 | 21.84 | .9526 | .000162 |
| .491 | 2.034 | 1049. | .6761 | .7520 | .7796 | 22.04 | .9466 | .000180 |
| .527 | 2.181 | 1125. | .6824 | .7559 | .7849 | 22.20 | .9412 | .000196 |
| .570 | 2.360 | 1217. | .6909 | .7613 | .7919 | 22.43 | .9343 | .000215 |
| .608 | 2.518 | 1299. | .6996 | .7668 | .7990 | 22.65 | .9280 | .000233 |
| .641 | 2.654 | 1369. | .7041 | .7696 | .8026 | 22.77 | .9224 | .000249 |
| .689 | 2.854 | 1472. | .7110 | .7741 | .8081 | 22.94 | .9138 | .000272 |
| .735 | 3.043 | 1570. | .7200 | .7800 | .8152 | 23.17 | .9053 | .000295 |
| .760 | 3.148 | 1624. | .7223 | .7815 | .8171 | 23.23 | .9004 | .000309 |
| .806 | 3.338 | 1722. | .7316 | .7877 | .8243 | 23.47 | .8914 | .000333 |
| .858 | 3.553 | 1833. | .7388 | .7925 | .8299 | 23.65 | .8806 | .000361 |
| .889 | 3.679 | 1898. | .7431 | .7955 | .8332 | 23.75 | .8741 | .000378 |
| .938 | 3.884 | 2004. | .7504 | .8004 | .8388 | 23.93 | .8631 | .000407 |
| .998 | 4.089 | 2109. | .7588 | .8062 | .8451 | 24.14 | .8516 | .000437 |
| 1.072 | 4.231 | 2183. | .7628 | .8090 | .8481 | 24.24 | .8434 | .000458 |
| 1.055 | 4.368 | 2253. | .7667 | .8117 | .8510 | 24.33 | .8353 | .000478 |
| 1.101 | 4.557 | 2351. | .7717 | .8152 | .8547 | 24.46 | .8237 | .000507 |
| 1.134 | 4.694 | 2421. | .7777 | .8194 | .8591 | 24.60 | .8151 | .000529 |
| 1.177 | 4.873 | 2514. | .7844 | .8242 | .8640 | 24.76 | .8035 | .000558 |
| 1.220 | 5.052 | 2606. | .7915 | .8294 | .8691 | 24.93 | .7916 | .000587 |
| 1.257 | 5.204 | 2684. | .7964 | .8329 | .8726 | 25.05 | .7811 | .000613 |
| 1.294 | 5.356 | 2763. | .8016 | .8367 | .8764 | 25.17 | .7702 | .000640 |
| 1.339 | 5.540 | 2858. | .8055 | .8396 | .8791 | 25.26 | .7570 | .000672 |
| 1.377 | 5.703 | 2942. | .8122 | .8445 | .8838 | 25.42 | .7448 | .000701 |

| TABLE A14. (CONT.) | | | | | | | | |
|--------------------|---------|--------|--------|----------|--------|--------|-------------|---------|
| Y (CM) | Y/THETA | Y-PLUS | M/ME | RHO/RHME | U/UE | U-PLUS | TAU/TAU-MAX | V/U |
| 1.419 | 5.877 | 3032. | .8187 | .8494 | .8894 | 25.57 | .7316 | .000733 |
| 1.463 | 6.056 | 3124. | .8235 | .8530 | .8917 | 25.69 | .7176 | .000766 |
| 1.504 | 6.229 | 3213. | .8303 | .8581 | .8963 | 25.84 | .7037 | .000799 |
| 1.540 | 6.376 | 3289. | .8354 | .8620 | .8998 | 25.96 | .6916 | .000827 |
| 1.599 | 6.618 | 3414. | .8424 | .8674 | .9045 | 26.12 | .6713 | .000875 |
| 1.637 | 6.776 | 3495. | .8456 | .8698 | .9067 | 26.19 | .6578 | .000906 |
| 1.667 | 6.902 | 3560. | .8466 | .8706 | .9073 | 26.22 | .6467 | .000932 |
| 1.715 | 7.102 | 3663. | .8550 | .8771 | .9129 | 26.40 | .6290 | .000973 |
| 1.748 | 7.238 | 3734. | .8578 | .8793 | .9148 | 26.47 | .6166 | .001001 |
| 1.772 | 7.338 | 3785. | .8632 | .8836 | .9183 | 26.59 | .6075 | .001022 |
| 1.804 | 7.470 | 3853. | .8666 | .8862 | .9205 | 26.67 | .5953 | .001050 |
| 1.863 | 7.712 | 3978. | .8721 | .8906 | .9241 | 26.79 | .5726 | .001101 |
| 1.895 | 7.806 | 4027. | .8761 | .8938 | .9267 | 26.88 | .5636 | .001121 |
| 1.922 | 7.959 | 4105. | .8781 | .8954 | .9280 | 26.92 | .5490 | .001154 |
| 1.963 | 8.127 | 4192. | .8848 | .9008 | .9322 | 27.07 | .5326 | .001191 |
| 1.996 | 8.264 | 4263. | .8899 | .9050 | .9355 | 27.18 | .5191 | .001221 |
| 2.021 | 8.369 | 4317. | .8911 | .9059 | .9362 | 27.21 | .5086 | .001244 |
| 2.056 | 8.511 | 4390. | .8945 | .9087 | .9383 | 27.28 | .4945 | .001275 |
| 2.114 | 8.753 | 4515. | .9011 | .9141 | .9425 | 27.42 | .4704 | .001328 |
| 2.152 | 8.910 | 4596. | .9067 | .9187 | .9459 | 27.54 | .4545 | .001363 |
| 2.193 | 9.078 | 4683. | .9095 | .9211 | .9477 | 27.61 | .4374 | .001400 |
| 2.244 | 9.299 | 4792. | .9181 | .9282 | .9529 | 27.79 | .4159 | .001447 |
| 2.273 | 9.410 | 4854. | .9202 | .9300 | .9542 | 27.83 | .4035 | .001474 |
| 2.320 | 9.604 | 4954. | .9246 | .9337 | .9568 | 27.93 | .3835 | .001517 |
| 2.358 | 9.762 | 5036. | .9297 | .9381 | .9599 | 28.04 | .3673 | .001551 |
| 2.399 | 9.930 | 5122. | .9329 | .9408 | .9618 | 28.10 | .3500 | .001588 |
| 2.432 | 10.067 | 5193. | .9376 | .9448 | .9646 | 28.20 | .3360 | .001618 |
| 2.485 | 10.288 | 5307. | .9402 | .9470 | .9661 | 28.26 | .3135 | .001666 |
| 2.520 | 10.435 | 5383. | .9435 | .9499 | .9681 | 28.33 | .2986 | .001698 |
| 2.566 | 10.624 | 5480. | .9504 | .9558 | .9721 | 28.47 | .2795 | .001738 |
| 2.623 | 10.861 | 5602. | .9539 | .9589 | .9742 | 28.54 | .2558 | .001788 |
| 2.661 | 11.018 | 5684. | .9577 | .9621 | .9763 | 28.62 | .2403 | .001820 |
| 2.708 | 11.213 | 5784. | .9635 | .9672 | .9796 | 28.74 | .2213 | .001860 |
| 2.754 | 11.402 | 5882. | .9652 | .9688 | .9806 | 28.77 | .2030 | .001898 |
| 2.791 | 11.555 | 5960. | .9680 | .9713 | .9822 | 28.83 | .1887 | .001928 |
| 2.835 | 11.739 | 6055. | .9729 | .9756 | .9850 | 28.93 | .1716 | .001963 |
| 2.886 | 11.949 | 6164. | .9760 | .9783 | .9867 | 28.99 | .1525 | .002003 |
| 2.922 | 12.096 | 6240. | .9784 | .9804 | .9881 | 29.04 | .1394 | .002030 |
| 2.983 | 12.348 | 6370. | .9822 | .9839 | .9902 | 29.12 | .1173 | .002075 |
| 3.028 | 12.538 | 6468. | .9839 | .9854 | .9911 | 29.15 | .1018 | .002107 |
| 3.069 | 12.706 | 6554. | .9860 | .9873 | .9923 | 29.19 | .0882 | .002135 |
| 3.115 | 12.895 | 6652. | .9878 | .9890 | .9933 | 29.23 | .0735 | .002165 |
| 3.144 | 13.032 | 6723. | .9904 | .9913 | .9947 | 29.28 | .0632 | .002186 |
| 3.188 | 13.200 | 6809. | .9915 | .9923 | .9953 | 29.30 | .0509 | .002211 |
| 3.235 | 13.394 | 6910. | .9926 | .9933 | .9960 | 29.33 | .0374 | .002238 |
| 3.277 | 13.568 | 6999. | .9943 | .9948 | .9969 | 29.36 | .0260 | .002261 |
| 3.310 | 13.705 | 7070. | .9955 | .9959 | .9975 | 29.38 | .0173 | .002279 |
| 3.355 | 13.889 | 7165. | .9967 | .9970 | .9982 | 29.41 | .0063 | .002301 |
| 3.406 | 14.095 | 7273. | .9972 | .9974 | .9984 | 29.42 | 0.0000 | .002314 |
| 3.437 | 14.230 | 7341. | .9977 | .9979 | .9987 | 29.43 | 0.0000 | .002314 |
| 3.502 | 14.498 | 7479. | .9986 | .9988 | .9992 | 29.44 | 0.0000 | .002314 |
| 3.534 | 14.630 | 7547. | .9992 | .9993 | .9995 | 29.46 | 0.0000 | .002314 |
| 3.580 | 14.819 | 7645. | .9998 | .9998 | .9998 | 29.47 | 0.0000 | .002314 |
| 3.632 | 15.035 | 7756. | .9999 | .9999 | .9999 | 29.47 | 0.0000 | .002314 |
| 3.669 | 15.187 | 7834. | 1.0005 | 1.0005 | 1.0003 | 29.48 | 0.0000 | .002314 |
| 3.691 | 15.287 | 7883. | 1.0003 | 1.0003 | 1.0002 | 29.48 | 0.0000 | .002314 |

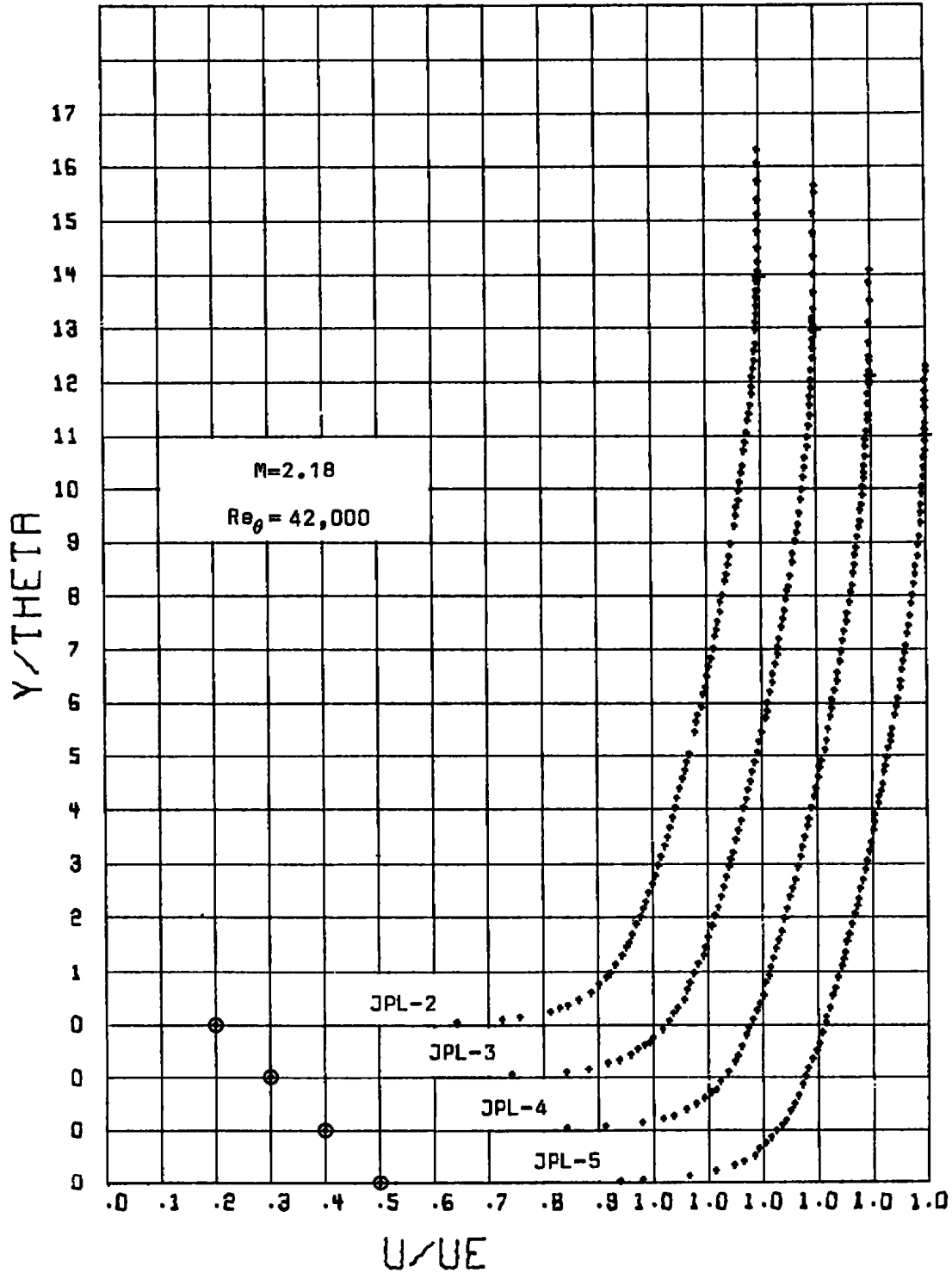


Figure A41. Mean Velocity Profiles.

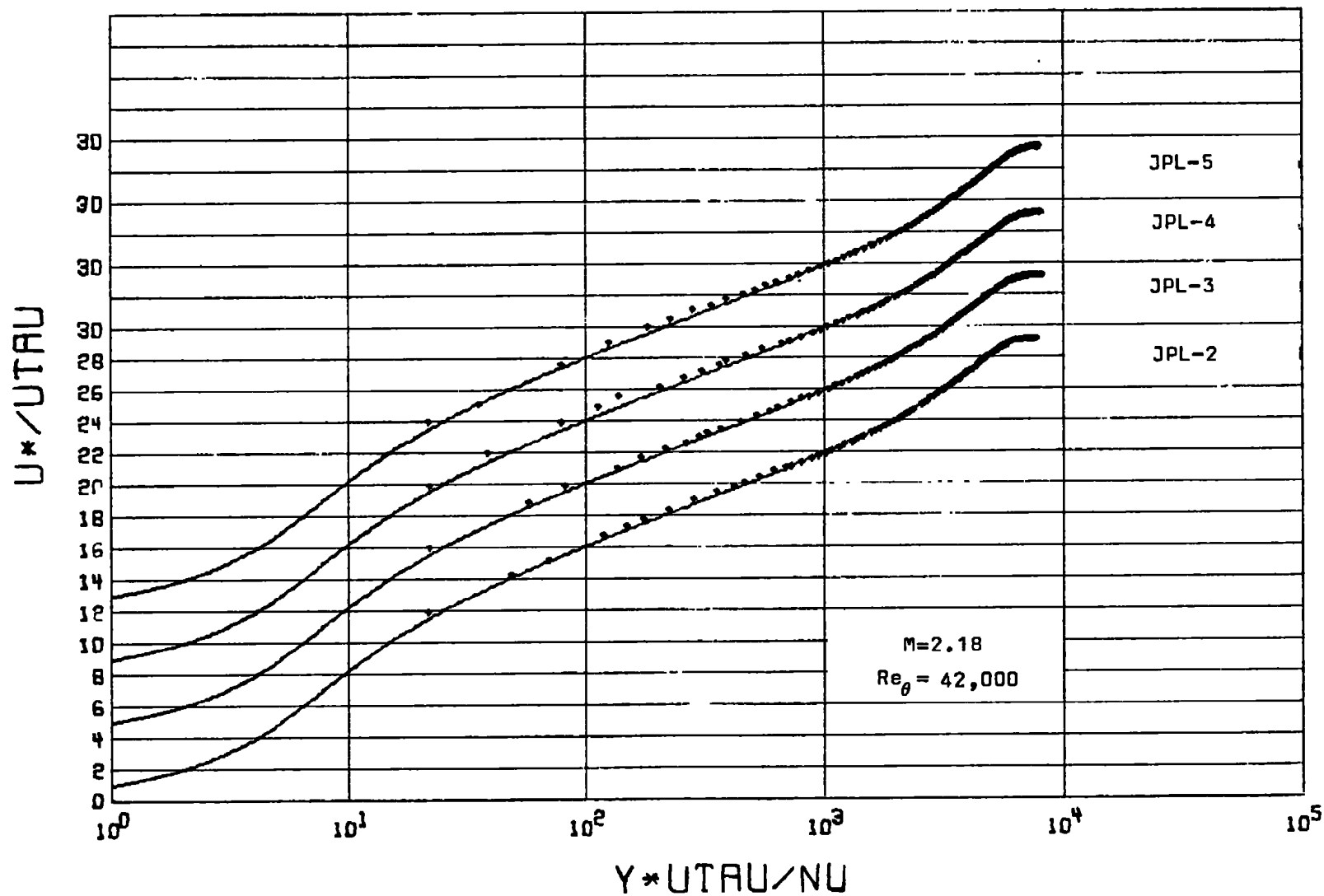


Figure A42. Van Driest Scaled Mean Velocity Profiles.

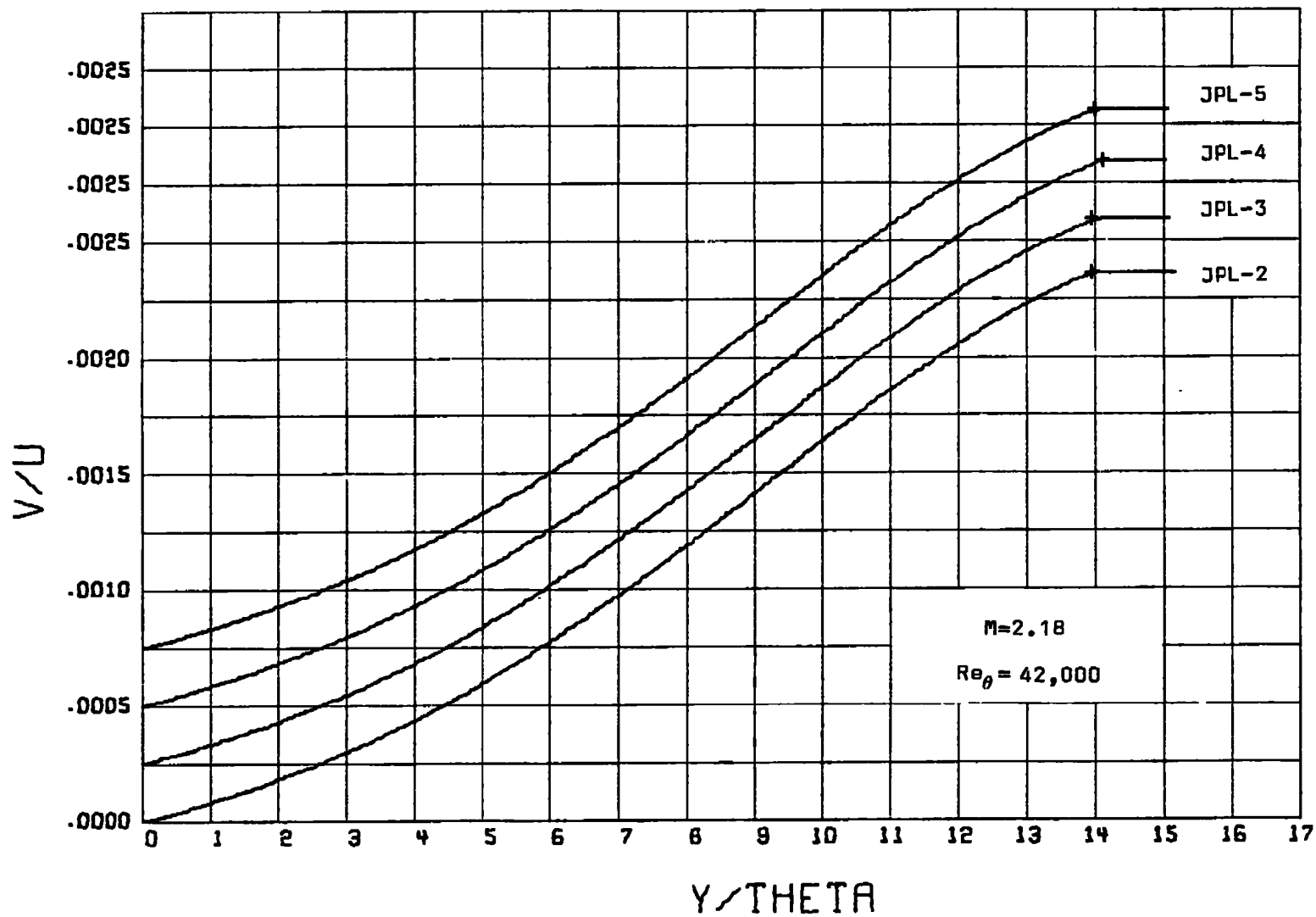


Figure A43. Normal Velocity Distribution.

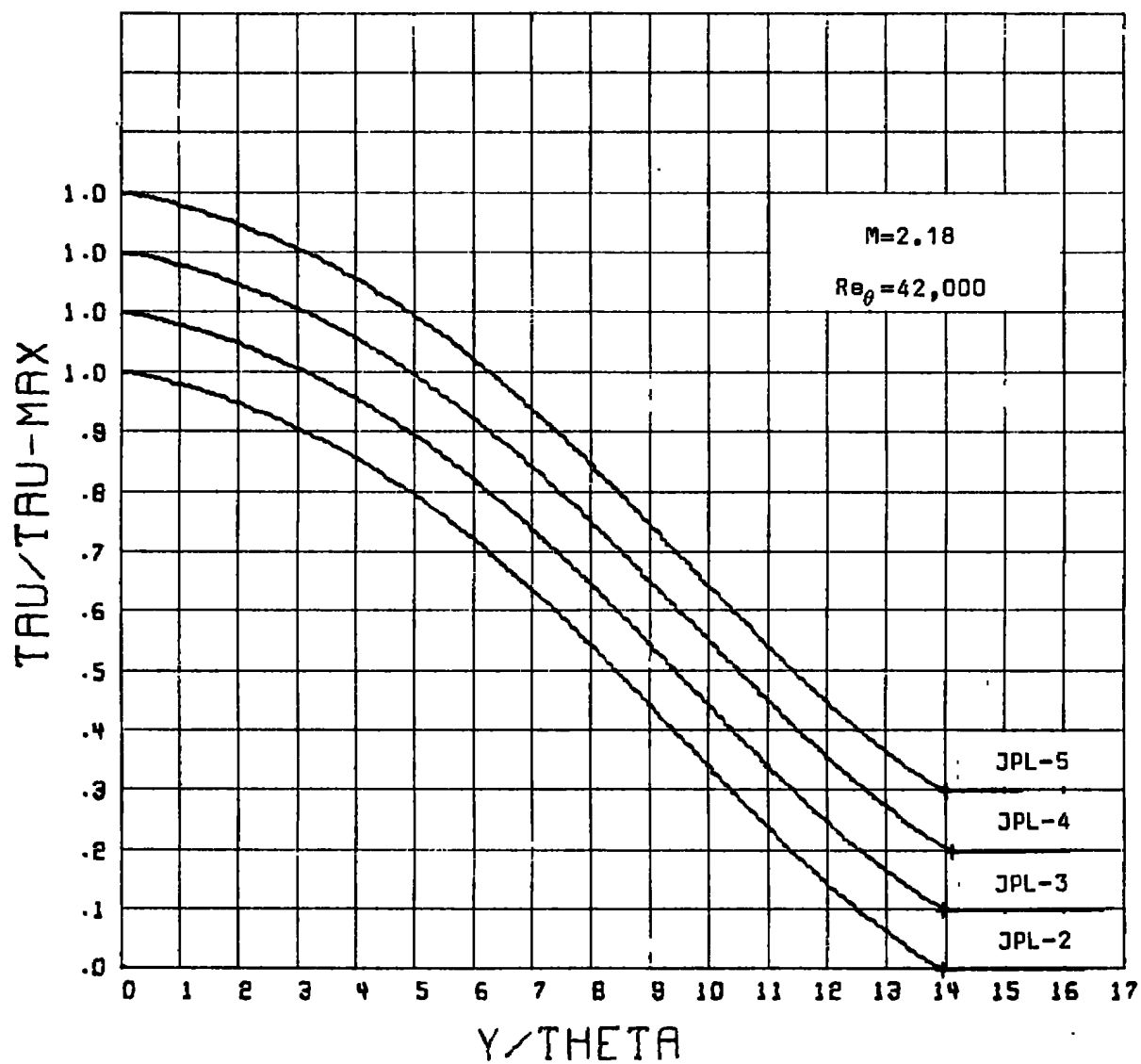


Figure A44. Shear Stress Distribution.

Nomenclature

| Symbol | Equation | Meaning |
|-------------|------------|---|
| c | (19) | constant in wall law (5.0) |
| C_f | (7) | local friction coefficient |
| C_p | (59) | pressure coefficient for Preston tube |
| D | (52) | diameter of Preston tube |
| $f(y^+)$ | (40) | function in wall law |
| $f_2(T')$ | (54) | function of reference temperature |
| F_f | (62) | scaling function for C_f |
| F_θ | (63) | scaling function for Re_θ |
| H | (6) | boundary-layer profile form parameter |
| m | (14) | function of Mach number |
| M_p | (53) | pressure Mach number for Preston tube |
| M_τ | (58) | friction Mach number for Preston tube |
| MOMB | (A3) | measure of momentum balance |
| P, Q | (30), (31) | definite integrals of velocity profile |
| r | (2) | temperature recovery factor (0.885) |
| Re_D | (52) | Reynolds number based on D |
| Re_θ | | Reynolds number based on θ |
| u, v | | streamwise and normal velocity components |
| u_τ | (15) | friction velocity |
| U | (25) | dimensionless velocity scaled according to Van Driest |

Nomenclature (Cont.)

| Symbol | Equation | Meaning |
|------------|----------|---------------------------------------|
| x, y | | streamwise and normal coordinates |
| Y | (20) | distance from wall in outer variables |
| β | (A1) | pressure-gradient parameter |
| δ | | boundary-layer thickness |
| δ^* | (4) | boundary-layer displacement thickness |
| θ | (5) | boundary-layer momentum thickness |
| κ | (9) | Kármán constant (0.41) |
| μ | | viscosity |
| ν | | kinematic viscosity |
| Π | (19) | strength of wake component |
| τ | | shearing stress |

Subscripts

| | |
|---------|------------------------|
| $()_e$ | edge or external value |
| $()_o$ | stagnation value |
| $()_w$ | wall value |

Superscripts

| | |
|---------|--|
| $()^i$ | value for incompressible flow |
| $()'$ | value at effective temperature |
| $()^+$ | value made dimensionless with u_τ, ν_w |
| $()^*$ | value for Van Driest scaling |